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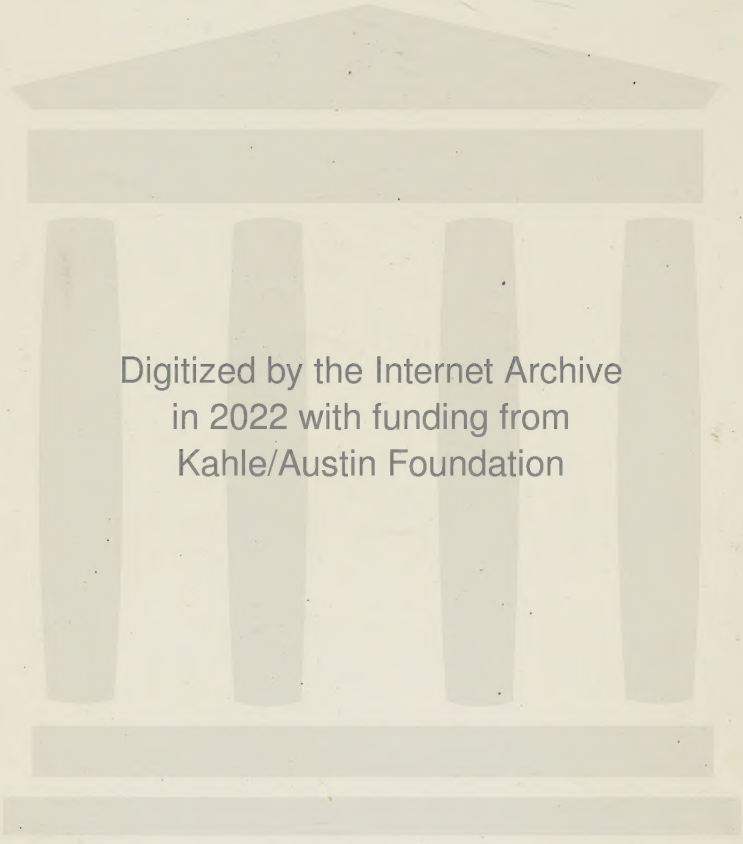
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PROCEEDINGS

OF THE

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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

M. P. M. Lessar's Second Journey in the Turkoman Country—Askabad to Ghurian near Herat.

(Read at the Evening Meeting, November 27th, 1882.)

Maps, p. 56.

In continuation of the account of M. Lessar's first journey given in the last volume of the 'Proceedings' (p. 486), we now give an abridgment of the narrative of his further operations, which the enterprising Russian surveyor has communicated to the *Golos* newspaper of St. Petersburg.

His first journey was performed in November and December 1881; he commenced his second, at Askabad, towards the end of April of 1882. During this short interval, he premises, a great change had taken place in the country. After the fall of Geok-tepeh, on January 24th, 1881, no further resistance of the Akhâls could be expected. Those of them who had fled to Merv and the Tejend after the capture of their stronghold, and were slow to believe in the amnesty proclaimed by the Russians, returned to their homes in September, and this completed the pacification of the country. The robberies which occasionally occurred on the Persian frontier and in the Steppe, on the routes to Khiva and Bokhara, ceased completely. It became possible to travel between Askabad and Sarakhs without escort, accompanied by only a few labourers armed with guns against chance robbers. The inhabitants of the Atak made closer acquaintance with the Russians as they went to Askabad, on business or out of curiosity, and sometimes in search of employment. M. Lessar took advantage of this last circumstance, and accepted the offer of the elders of the Kahka village to provide him with an escort of twenty Alieli Turkomans, on good horses, for his second journey.

He left Askabad on April 28th, and, following the same route through the Atak as on his first journey, he reached Sarakhs, 187 miles distant, on May 3rd. The word Atak (signifying "foot of the mountains"),* he says, is unknown either in Afghanistan or in Persia. The western part

* Properly "skirt of the mountain"; the same word as Attock on the Indus.—[Ed.]

of the oasis (as far as Gawars) which is inhabited by Tekkes, is usually called Akhál, and the narrow strip of inhabited land towards the south-east of it is known in the adjacent countries under the name of Arakaj. But the Russians have introduced the use of the term Atak, to designate all the country at the foot of the mountains between the Russian boundary and Sarakhs. Gawars is the last inhabited point of the Akhál-Tekke oasis. Baba-durmaz, 50 miles distant from Askabad and situated on the boundary of the Russian dominions, has no inhabitants. Only two settlements in the Atak are occupied by Persian Shiites who are subjects of Nasr-eddin-shah. All others are inhabited, either by Turkomans of the Alieli tribe (as at Kahka and partly at Kuran), or by Tekkes from Merv and elsewhere. All this population has migrated into the country quite recently, after a fifty years' struggle against the former inhabitants,—the Emrali, Karadashli, and Alieli. They live in clay homesteads, or *kebitkas* (felt tents), but the number of the latter is rapidly diminishing, as the population becomes settled. Water is scarce throughout the country, the streamlets being small and distant from one another; besides, the upper parts of the streams are in the hands of the Persians, who are only too happy when they have an opportunity of molesting those who were formerly their oppressors.* Thus the Turkoman population are often deprived of their harvests by water being intercepted by Persians, and this water-question is becoming most important as the Turkomans say they will be compelled to abandon their settlements, a course which would again convert the Atak into a desert. The complete list of settlements in the Atak, as given by M. Lessar, is as follows:—Annau, 13 versts ($8\frac{2}{3}$ miles) from Askabad, 200 kebitkas; Gawars, 20 versts ($13\frac{1}{3}$ miles) from the above, 40 kebitkas; and Baba-durmaz, 38 versts further ($25\frac{1}{3}$ miles), now uninhabited, on the Russian frontier. Artik, 16 versts ($10\frac{2}{3}$ miles) from Baba-durmaz, 20 kebitkas; Lutfabad and Kuran (five versts—$3\frac{1}{3}$ miles—from above), and many small villages scattered over the space of 28 versts ($15\frac{1}{3}$ miles) from Lutfabad to Kahka. This group of settlements, which represents an aggregate of 500 kebitkas and houses, is the richest part of the Atak; the fields are larger than elsewhere, and there are excellent gardens; they receive water from the Rudkhana, or Rudbar, the largest river of the Atak. Kahka, 500 kebitkas, is situated on a river formed by the junction of the Lain and Archin streams. A small settlement of 20 kebitkas, Naurek, is situated above the ruins of Khajamed, 17 versts ($11\frac{1}{3}$ miles) from Kahka. Dushak, or Chardeh, 21 versts (14 miles) from the above, 160 kebitkas, on the

* Colonel Stewart informs us that the population of the two Ataks is very mixed, being composed of Kurds, Persians, and Turkomans, but all are subjects of Nasr-eddin-shah, and have paid revenue regularly for at least fifty years in the northern Atak. The Turkomans are interlopers, and have been allowed to settle on paying revenue. The Alieli Turkomans came from near Andkui in Afghanistan. M. Lessar has underestimated the number of Shiah villages in the Ataks, there being many more than two villages in which the chief portion of the population are Shiahs.—[Ed.]

Chardeh river; Mehna, 44 versts (29⅓ miles) from Dushak, with 130 houses; and Chacha, 16 versts (10⅔ miles) further, with 70 houses, are all dependent for water upon the Persians. On the remaining 55 versts (37 miles) to Sarakhs there is no water, and the Robat cistern is filled with earth. Thus, the population settled between Baba-durmaz and Sarakhs may be estimated at about 7000 Alieli and Tekke Turkomans, to whom must be added the Persians at Lutfabad and Shilghan (Chilian). In fact, the population varies every day, and at present is increasing; but it cannot increase much, on account of the want of water. This population lives on agriculture and gardening; only at Chacha are there a few plantations of cotton trees. Altogether, these people are very poor and had to endure great sufferings during the first year of their settlement in the Atak. Of course, there is no trade worth speaking of, and the bazaars at Lutfabad and Kahka fully satisfy the very limited wants of the Turkomans.

At Sarakhs, M. Lessar was told by his escort that there was no road to Kusán on the eastern bank of the Hari-rúd, and no fords across the river in the neighbourhood of the fort. But it soon appeared that his Alielis, one of whom was a robber of renown who perfectly knew all the roads in the country, were simply afraid of possible encounters on the right bank with such Mervis and Saryks as might have some former accounts to settle with them for robberies, and that the information they gave was false. So, on May 5th, the Russian surveyor ordered his caravan to cross the Hari-rúd close by Sarakhs. The environs of Sarakhs had become more lively since his first journey. New settlements of Mervis had grown up around the fort on both banks of the river, with the permission of the Persian Government, to whom they have to pay a tax equal to one-tenth of their harvest.

Already at Daulat-abad the Hari-rúd divides into many branches, spreading far and wide at some places, so that at low water, that is, in August and sometimes as early as July, the river itself no longer reaches Sarakhs. Ten miles above this place there are dams erected to direct the water into three deep canals (*aryks*) that bring it to Sarakhs, and even some 10 or 12 versts (seven or eight miles) further north; one of these aryks is dug on the Persian bank of the Hari-rúd and two are on the eastern; all three run nearly parallel to the bed of the river. This locality about Sarakhs which the Persians consider at present as their own, is one of the best along the whole course of the Hari-rúd from Kusán downwards, the river flowing between flat banks suitable for culture only as far as Pesh-robát. Further down it enters a gorge between high mountains; valleys where canals could be dug are few and small, and a second widening of the valley of the Hari-rúd begins only at Pul-i-khatún on the Persian bank and at Kassan-kala on the eastern (16 versts—10⅔ miles—south of Sarakhs). Between Kassan and Pul-i-khatún the Hari-rúd flows in one bed, 100 to 140 feet wide. Flood

water comes about the beginning of February and the river remains at a high level until the middle of April; during this period fording becomes dangerous on account of the rapidity of the current. But in the second half of April (new style) the river can be crossed at many places, in a depth of not more than four feet. During the summer the amount of water diminishes rapidly, and in June and July the river can be crossed wherever the banks are not too steep.

All along the Hari-rúd the slopes of the hills are covered with pistachio-trees; here and there are mulberry trees. Close by the river the banks are covered with willows, brushwood, and rushes, so thickly that at many places it is impossible to approach it, even on foot. There is everywhere plenty of grass. The water of the Hari-rúd, although muddy, is agreeable and wholesome.

The continuation of the Hari-rúd north and north-west of Sarakhs is known under the name of the Tejend. There is a current in this river only during the flood season, when it becomes deep, and at many places quite impossible to ford. Mr. O'Donovan, when crossing it a little to the north of Kangaly-guzar, in February, was compelled to swim. The officers Alikhanoff and Sokoloff, who accompanied the caravan of M. Konshin to Merv, crossed the Tejend in February at the Karybend dam; it was then 72 feet wide and $5\frac{1}{2}$ feet deep. But its depth is often much greater than that, and for four or six weeks each year the caravans can cross it only at Alamán-jangal, that is, at a place which usually is not reached by the Tejend, but only by canals drawn from it. When, however, the dam at Herat is broken, then the river inundates the country at Alamán-jangal. Still, as a rule, the Tejend is quite dry during the summer, but there are in its bed series of lakes that are supposed to be fed either by springs or by subterranean continuations of the Chacha, Mehna, and Dushak, streamlets which disappear in the desert 15 to 20 versts (10 to $13\frac{1}{3}$ miles) before reaching the dry bed of the Tejend. All settlements of the Tejend-Tekkes are concentrated north of Karybend, towards Alamán-jangal, the other names which we see on our maps being only names of fords.

The country between the Murgháb and the Hari-rúd was very little known until lately. On the Murgháb, to the south of Merv, there are a few settlements of the Saryks, such as Yulután, Panjdeh, and Bálá-Murgháb; further south, on the slopes of the Paropamisus, are the Jemshídís and Teimúrís; but to the west of the Murgháb, as far as the Hari-rúd, there is not a single settlement, all forts on the Kushk having been abandoned by the inhabitants, and in ruins. The route from Merv to Herat along this river has been described by Shakespeare and Abbot, but the country between the Hari-rúd and the Kushk remained quite unknown; no European had visited it, and even in the adjacent countries it was known only to the robber-chiefs. Wherever they directed their raids, they always passed through this country, and therefore nobody dared to settle between the Kushk and the Hari-rúd; the few

forts erected fell into ruin, and the roads became impracticable. Now this country has become safer. Robbery is no more the general occupation of the Mervis, but only of isolated bands; it has remained a regular source of income only with the Saryks, and it is difficult to say what would have been their behaviour towards a small Russian caravan had they met with it; but M. Lessar had the good fortune to meet only with Mervis and Afghans, with whom things were easily arranged, though not without some risk at the first encounter.

The distance of 145 miles between Sarakhs and Kusán was accomplished in five marches. The Hari-rúd, which can always be forded close by Sarakhs, with the exception of a few days in the year, was crossed within half a verst from the Persian fort, its bed being divided there into four branches, which flow between flat banks covered with gravel. On the opposite side of the ford, the Tekkes are erecting their own fort, with the permission of the Persian Government, and for three versts beyond it the road passes among the fields and irrigation-canals of the new Turkoman settlers; then it follows the canals mentioned above.

Dau-kala, 14 versts (9⅓ miles) from Sarakhs, is a small fort, now in ruins. Above it the Hari-rúd flows close along the foot of high crags, and therefore the road leaves the banks of the river and crosses a low range of gently sloping hills; the soil is clay, and the road continues quite available for wheel traffic. It descends again to the banks of the Hari-rúd, opposite the Persian fort Naurúz-abád, which at the time of M. Lessar's journey, was abandoned by the inhabitants, as well as another fort of the same name, erected by the Tekkes on the eastern bank, and situated four versts south of the Persian fort and 21½ versts from Dau-kala. For 10 versts (6⅔ miles) more—that is, nearly as far as the hill Shir-tepeh—the road follows the banks of the Hari-rúd; then it turns south-east, and leaves the river, which it approaches again only at Kusán. From this turn to the ruins of the *robát*, situated at the entrance of the Barkhut pass (33 miles from Kusán), the general character of the road is the same: it goes partly through a flat country and partly through undulating, hilly tracts. Steep ascents on the road are, however, rare, and little labour, at a few places only, would be required to render it perfectly available for carriages. There are plenty of places with good grass for horses.

At a place 20 miles distant from Naurúz-abád there is a karez half a verst long; that is, a chain of wells connected together by underground channels, to collect water from the ground; they had not been cleaned out for a long time, but formerly they contained water available for drinking, though not quite sweet. The two wells, Adam-yölan (27⅓ miles from Naurúz-abád) are 25 feet deep, and contain plenty of good water; there is excellent grazing ground around them. At Agar-chisme (8⅓ miles from these wells) M. Lessar found an excellent spring, and 8½ versts further, at the ruins of the robát Kungrueli, again wells with plenty of water, though slightly brackish.

Two roads led from this place to Afghanistan. One of them goes through Ak-robát, and the other, which was followed by M. Lessar, through Kizil-bulak and Khombôu. After having traversed 26⅓ miles, M. Lessar reached Kizil-bulak, a rich well containing sweet water, situated in a cleft which is cut in red sandstone, and runs to the Hari-rúd; other 25 versts brought him to the ruins of a robát situated at the foot of the pass that leads across the Barkhut mountains. This pass, the summit of which (3100 feet above the sea-level and 900 feet above the adjacent country) is reached by following a small stream, presents no difficulties to the traveller; even in its present state very little work would be required to render it fully available for wheel traffic, and a good highway could be easily laid out by avoiding a few steeper slopes. The surrounding hills are sandstone. The descent is still easier, and perfectly adapted now for wheel traffic. Half-way along is a spring, Khombôu (24 miles from Kizil-bulak), and two versts lower the ruins of the robát Abdullah-khan. Four miles further down the route divides into two branches, one of which leads to Pesh-robát, situated on the left bank of the Hari-rúd, and the other to Kusán, both going through a perfectly flat country. Kusán (30⅓ miles from Khombôu) is the first Afghan settlement on the banks of the Hari-rúd on the way from Mash-had (Meshed) to Afghanistan, and the route between this place and Herat along the north bank of the Hari-rúd has been described several times by English and Russian travellers.

Comparing the road he followed with other roads about which he obtained information, M. Lessar concludes that the former is decidedly the best between Sarakhs and Kusán, and, therefore, between Askabad and Herat. The roads which lead from the Caspian to Herat viâ Mash-had present, of course, many advantages on account of their passing through inhabited, cultivated, and well-watered tracts, but they have to cross several chains of mountains; and to construct a highway, and still more a railway, across those mountains would involve a very great amount of labour. Still worse in this respect are the roads from Askabad to Mash-had, as they cross the Dáman-i-koh range. The Garmab pass, between Geok-tepeh and Bujnúrd, which is considered the easiest, would present immense difficulties for a railway; and the heavy expense thus incurred could hardly be compensated by any advantages of increased traffic through the more densely populated districts of Khorassan instead of the Atak. If a railway must be built within a short space of time, there can be no hesitation in giving the preference to the Sarakhs route. The whole length of a railway from Askabad to Herat, viâ Sarakhs, would be 585 versts (390 miles). Of this, the first 200 and the last 90 miles would require no earthwork at all; and on the middle stretch, 100 miles long, there would be no more earthwork than on an average railway in Russia in Europe, which usually runs through tracts alternately flat and hilly. The Khombôu pass is very easy; but of course

there would be a certain amount of earthwork to do on this stretch, if the Barkhut mountains were to be crossed by a railway. Still, if the speedy construction of a railway were required, the work in the hilly part (including some steep gradients, usually allowed for on such routes) need not be behind the work in the two other parts in point of time, this being an immense advantage that could not be realised elsewhere.

As to those roads between Sarakhs and Herat that follow the Persian bank of the Hari-rúd, they have the advantage of leading through a well-watered country, but they have also to cross high ranges of mountains. There are other routes of less importance between Herat and Merv, the most interesting of them being that which departs from the road followed by M. Lessar at Kungrueli. It goes from this place to Ak-robát, a locality abounding in sweet water that is reached by wells only seven feet deep; thence it leads to Gurlin and Cheshmeh-sebz—two sweet springs—and crosses the Barkhut mountains by following the course of this last streamlet; this pass is described as being very much like that of Khombôu. Beyond the pass, one road leads to Kusán, through a quite flat country, and the other to Shakivan, through undulating tracts. The road from Merv to Ak-robát proceeds first along the Murghâb; then, along the Kushk to Chemen-i-Bíd (the willow-meadow), described by Shakespeare and Abbot, where it turns towards Ak-robát. This road avoids completely the passage across the Paropamisus range at the sources of the Kushk; the Barkhut hills, which this route from Merv to Herat crosses at Cheshmeh-sebz, are in reality the prolongation of the Paropamisus range, which has been considered as an insuperable obstacle to wheel traffic. The whole length of this road, from Merv to Herat, is 380 versts (253 miles).

On undertaking his journey, M. Lessar did not intend to enter Afghanistan, but expected to follow a direct road from Khombôu to Persia, viâ the ruins of Pesh-robát (Toman-Agha). There are two or three fords across the Hari-rúd available for this route, but there was nobody to point them out, and therefore the Russian traveller was compelled to go to Kusán, to find there the necessary guides. At this last place, the environs of which fully exhibit the benefits of the pacification of the country, the clay homesteads of former inhabitants being restored, and cultivated fields extending to a certain distance from the fort, M. Lessar was received with great astonishment, but otherwise in a friendly manner. The commander of the fort of Kusán, however, refused to give guides, and sent a messenger to Herat, to ask his superiors what to do with the unexpected traveller; M. Lessar proposed in the meantime to go to Ghurián, to wait there for the answer, which proposal was readily agreed to, as the responsibility of the Khan of Kusán was thus shifted to his superior, the Khan of Ghurián. At Ghurián, M. Lessar was very well received, and the next day, a special envoy of the ruler of Herat, Nizám-ed-dín-khan—

an intelligent and clever man, better known under the name of Akhundzádeh (i. e. the priest's son)—arrived with a numerous escort from Herat to inquire as to the object of M. Lessar's journey. The curiosity of the Afghan diplomatist having been satisfied, the Russian surveyor was permitted to continue his journey, and on May 12th he left Ghurián for Mash-had.

The road runs first through rich pasture-grounds covered with herds of sheep and horses, the latter being the chief export from Afghanistan to Persia; the studs around Ghurián are said to number as many as 40,000 head. The road, which takes a north-western direction, soon leaves the banks of the Hari-rúd and crosses a low spur of the mountains. The wide valley beyond is spotted with ruins of robáts and clay hovels; indeed, every yard of this road bears traces of the incursions of the Mervis and Saryks. The buildings are in ruins and the *karezes* filled with mud. Altogether water is scanty; a streamlet, the Shur-áú (salt water), which takes its origin in the hills to the north, contains some water only after rain, like all the other streamlets in the district of Bakharz which is situated to the north of the road. Within one verst of the Shur-áú, the guide showed M. Lessar the ruins of an Afghan settlement, said to be the present boundary between Persia and Afghanistan, which would thus have a more westerly position than on our maps. Many artificial mounds, like those of the Atak, are spread over the valley, and the Afghans regard them as remains of forts erected by Nadir-shah.

Herat, situated at the spot where the road from Mash-had emerges from the mountains, is at present of great importance for the protection of the Persian frontier from Turkoman raids; detachments of soldiers are continually sent therefrom to the different passes which lead across the mountains, and so the highway between Kháf and Mash-had is maintained almost quite secure. After having crossed a first range of hills by a route nearly devoid of fuel and with very little grazing ground, M. Lessar reached Kháf, the residence of the English agent, Colonel Stewart, who prefers to stay in Persia and to travel in the neighbourhood, instead of at Herat, among the Afghans. Kháf consists of several forts; the shops in the bazaar are quite empty, all trade being carried on within the forts, which are surrounded by beautiful gardens and plantations of *teriak* (opium), mulberry, and fruit trees. The wares in the shops are mostly of Persian origin, with the exception of some English and Russian goods.

Between Kháf and Turbat-i-Haidari the road follows a broad valley inclosed between high mountains to the east and low hills to the west. It is well peopled, and our maps do not show all the settlements; perhaps many of them are of recent origin, since the Saryks do not venture to push their raids into the valley; but a further increase of the population will soon be checked by the scarcity of water. Each village with its

gardens and fields covered with barley, wheat, trefoil, and *teriak*, appears as a pretty green cluster amidst the dry surrounding region that does not produce even the smallest patch of grass or brushwood. Grass is so scarce that only khans can keep horses; whole villages have not a single horse, and all traffic is carried on by donkeys. The scarcity of wood for building purposes has originated the well-known special type of Persian building, subdivided into small compartments by rows of pillars which support small arches. Robáts, erected close by small streams or *howzes* (cisterns), are numerous.

Turbat-i-Haidari, one of the largest towns of this part of Persia, is surrounded by beautiful gardens which the party took one hour to cross. It has also an excellent bazaar, which is built of bricks and shaped like a T, with spacious shops and wide arcades between. The articles of trade are the same as in Mash-had, that is, food produce, stuffs, and all kinds of necessaries for travelling on horseback, tea, French sugar, lamps, iron and glass ware, and jewellery.

The road between Turbat-i-Haidari and Mash-had is very difficult. It crosses three chains of mountains, the passes reaching 6500 feet above the sea-level. The slopes on which the road ascends are very steep especially between Kafir-kala and Turukh; even donkeys were continually slipping and falling on the stones. There is plenty of water all along the road, but no grazing grounds, nor fuel; even in villages wood is dear and not found everywhere. Still the road is very busy, especially on the approach to Mash-had, with caravans and numerous pilgrims who go to the holy city of the Persians.

After a few days' rest at Mash-had, M. Lessar started, on May 21st, for Turbat-i-Sheikh-Jám on his return journey to Sarakhs. There are several roads which connect these two places. The English maps give that which runs close by the foot of the mountains and was frequented formerly when the highway was not safe. The Russian map shows another road situated a little lower; but this also passes over the slopes of the hills and has to cross several deep ravines. At present, the traffic follows a third road, at the bottom of the valley, that is, through Ferimun, Katty-Shemshir, and the ruins of Kheir-abad and Lenkar; this is far better than the two former, and shorter by about 10 versts. In comparison with the road to Khaf, it is a desert, traces of recent raids of Turkomans appearing everywhere; still, at present this country also is becoming more animated. The road goes mostly on flat ground, and has to cross some ravines and hills only on the stretch four miles long between Hussein-abad and Ferimun, that is, on the water-divide between the Kara-sú and Jám rivers. The building of a railway would, however, meet with no difficulties, and beyond Ferimun the ground is again quite flat. There is plenty of water all along this route, and many settlements. Only those of Hussein-abad, Kheir-abad, Haus-sefíd, and Abbas-abád are deserted, the cistern of Hauz-sefíd being further

destroyed. The inhabitants are Persians, excepting at Lenkar where there are many Salyrs who settled there some 30 years since; and whose language is now a mixture of Turkish and Persian. For the protection of the country from robbers, two places, Bujgun and Mohsin-abad, are occupied by horse-militia; 400 men stay at Bujgun and 100 at Mohsin-abad which is a village with 300 houses, abundantly provided with water from *karezes*. The Mohsin-abad sú, a tributary of the Hari-rúd which we see on our maps, is known in the country under the name of Ravas; it is not a river, but a simple ravine that contains some water after heavy rains. Altogether, our maps with their numerous rivers and affluents in the basin of the Hari-rúd are well calculated to mislead; in reality these rivers are but so many dry ravines. As to rivers, there are only two, the Kara-sú and the Jám; the latter has a continuous current of water from the ruins of Kheir-abad to the Hari-rúd, but it has no affluents. The Taïbad-su does not reach the Hari-rúd, all the water being drawn from it for irrigation at Taïbad. Altogether it may be said that water in this country is rather scanty.

From Mohsin-abad M. Lessar went to Kehriz, through a quite flat country. All villages are in ruins, and only recently has the population begun to return to their homes. The robát Dogarou on the Afghan boundary is also a heap of ruins. From Dogarou are easily seen the fort and robát Kafir-kaleh, where five men come every day from Kusán to watch the ford. At this place M. Lessar turned towards the north-east and soon reached the Hari-rúd at Pesh-robát (Toman-Agha)—a hospice which is said to have been built by the daughter of Timur; at least, the Khan of Mohsin-abad said that an inscription on the greystone-façade of the robát has this meaning. The solid building of bricks has remained until now; its proportions are really remarkable by their grandeur, and the arches are still in a good state.

Three different roads led from Dogarou to Zúr-abád. One of them crosses the Hari-rúd, enters the interior of the country, to avoid the mountains through which the river has cut its bed, and joins it again at Zúr-abád. The Hari-rúd must thus be forded twice, which is very inconvenient during the rainy season; besides, the road in the narrow ravines of the right bank is said to be difficult. The second road, followed by M. Lessar, is a mere footpath in the mountains that often completely disappears. It follows first the banks of the river to Kalsan-kala; then it turns to the west and crosses the Jám, three versts above its junction with the Hari-rúd; thence it crosses a hilly tract, passing by the ruins of Kaleh-i-Melou, and at a distance of eight versts from this last place enters the mountains. The road disappears, and a small path which often is hardly perceived, leads through narrow ravines, climbs high passes, and descends into deep valleys. The slopes of these mountains are covered with trees, and quite a forest is seen at the Ghelebet streamlet; there is plenty of water and grazing grounds everywhere; but to render this

road available for wheel-traffic is entirely out of question. The third road is the longest, but also the best; it leads through Turbat-i-Sheikh-i-Jám and Lenkar to Zúr-abád; and there is only one march to make through the mountains.

Zúr-abád has lately acquired importance, some 2000 kebitkas of Salyrs having settled there, with the permission of the Persian Government. Formerly, they resided at Old Sarakhs, but about the years 1870–72 they were attacked by Mervis who took all their cattle and forced most of them to emigrate to Merv, where however they received no land, but were compelled either to live on cattle-breeding, or to become labourers to the Tekkes. During the expedition of 1880–81, there were 4000 kebitkas of Salyrs at Merv, and the other parts of this tribe were scattered at different places, namely, about 1000 kebitkas on the Murghab among the Saryks, 400 at Charjúi, 200 at Maymeneh, and about 100 houses at Pul-i-salár close by Herat. Last year, the Mervis were induced by Tykma-serdar not to detain the Salyrs longer, and 2000 kebitkas of this tribe emigrated to Sarakhs; but the land around Sarakhs was too good for them, and the Persian Government accordingly proposed to them to settle at Zúr-abád, expecting that their settlements would be a useful barrier against the raids of Saryks and Mervis. The Salyrs are the weakest Turkoman tribe and could not maintain by force their rights on Old Sarakhs; besides they came from Merv quite destitute, without having corn for sowing, and thus they were compelled to accept the proposal of the Persian Government. But they are anything but satisfied with Zúr-abád, where the streamlets run in narrow valleys and land suited to irrigation and culture is very limited; they are all the more discontented that the 2000 kebitkas of the same tribe who remained at Merv desire to join their countrymen and to settle all together; but there is no land for that purpose around Zúr-abád.

Two roads lead from Zúr-abád to Pul-i-khatún: one of them goes by the eastern bank of the Hari-rúd and crosses it twice; the other remains on the Persian bank and crosses high mountains with steep slopes to Dehna-der-bend; at this place it descends to the Hari-rúd and follows its course to Sarakhs. The name of Pul-i-khatún signifies "the bridge of the lady"; there is, indeed, a bridge 175 feet long across the Hari-rúd, which is said to have been built by a woman whose name is unknown to the Tekkes; four arches of it are still in good condition, but the fifth was destroyed by Medhly-khan during his march on Merv.

On May 30th, M. Lessar was at Sarakhs, after having thus successfully explored the country between Sarakhs, Mash-had, and Herat, and obtained so much valuable information as to the roads, formerly quite unknown, which unite together these three important places. Although not rich in scientific observations, this journey is surely a great addition to our very imperfect knowledge as to the topography of this country.

Major-General Sir Henry Rawlinson read the following notes on the foregoing paper:—

M. Lessar's report of his journey from Askabad to Herat is a very interesting document, and the unpretentious way in which it is drawn up enhances its value in the eyes of geographers. M. Lessar has now supplied the missing link in the trace of the direct line of communication between Russia and India, dissipating the fallacies which have hitherto obscured the subject, and giving us for the first time a true contour sketch of the face of the country. Over and over again in this hall and at other public meetings have I heard florid allusions to the "pathless deserts" and the "inaccessible mountain ranges" which nature has built up as a barrier against all approach to India from the north and north-west. Only in the last number of the *Nineteenth Century* I read from the pen of one of our most accomplished political writers, and in deprecation of the notion of any possible advance of the Russian power towards India: "It is one thing to be brought into collision with barbarous tribes, to subdue and to annex them; it is another to cross a great mountain chain for the purpose of invading the territory of a civilised power." Now this "great mountain chain," which, according to the optimist school, is to serve as a palladium for India, turns out, on the showing of M. Lessar, to be a mere paltry line of sandstone hills, not 1000 feet in height, which could be crossed by a carriage road in a couple of hours, and which would crumble before the touch of a Russian railway engineer. If M. Lessar had done nothing more than explode the Paropamisus bugbear, which assumed that the mountains north of Cabul, 20,000 feet in height, were prolonged at the same elevation to the westward, he would have rendered us an important national service; but he has done much more. He has traced with the eye of an engineering geographer the line of the Russian advance, in the past and in the future, from the Caspian to Askabad, from Askabad to Sarakhs, and from Sarakhs to Herat, and he has shown that, as far as physical difficulties are concerned, there is no reason why, at any time and within the limitation of a few months, a continuous railway should not be built from the Caspian to the western Afghan capital; to which I may add that if that work were once executed, a week would suffice for the transport of merchandise (and if merchandise, why not troops and stores?) from the Caucasus headquarters to Herat.

But I will now follow M. Lessar more into detail. He dwells but little on the earlier section of the Russian line, having exhausted that subject in his earlier reports. It is now well known that a line of rails had been laid down from the Bay of Michailovsk, near the old mouth of the Oxus, on the eastern shore of the Caspian, to Bami, at the opening of the Akhál oasis, and that a tramway is being constructed from Bami to Askabad. To connect Michailovsk with Krasnovodsk, where alone there is anchorage in deep water adequate to the requirements of a great

Asiatic terminus, a branch line of some 50 or 60 miles will have to be constructed, making the total length of the line from the Caspian to the Russian headquarters in Akhál about 380 miles, which is a little under my former estimate. It is considered by the Russian officers that a mistake has been made in selecting Askabad for the headquarters site rather than Geok-tepeh, which is situated at the point where the Khorassan-Khiva road, running north and south, crosses the Akhál-Merv road running east and west, and which is also surrounded by a richer and better watered country. Askabad, indeed, at present is very indifferently supplied both with water and provisions, and until relieved by a tramway or railway from the westward, will always be in difficulties.

The second section of the contemplated Russian line—that stretching from Askabad to Sarakhs—is described in some detail in M. Lessar's report, and merits our close attention. From the descriptions of previous travellers, and especially from the reports of Major Napier, who personally inspected a considerable stretch of the Atak region, we were already sufficiently acquainted with its general character. We knew that the range, at the foot of which stretched the high road from Kizil Robat to Askabad, running nearly west and east, trended to the south after passing Deregez, and gradually diminished in height and boldness. We knew also that the slopes of the range facing the desert retained the name of Atak (Attok), or "the skirt," and were sparsely inhabited by Turkoman colonists, who paid the *zakkát*, or "tithe" to the chiefs of the overhanging Persian hills for the privilege of using the water that descended from them for the cultivation of their fields. In discussing the probable advance of Russia along this line on the occasion of Mr. O'Donovan's paper on Merv being read at our evening meeting on March 27th of this year, I assumed, as I had every reason to assume, that the Persian nationality of this Atak district was undisputed, and that it could not therefore be traversed by a Russian railroad, except under the authority of some special arrangement with the Shah. As a matter of history, it was notorious that the slopes in question, from Akhál to Sarakhs, had always been an integral portion of the province of Khorassan. Nissa, Abiverd, and Mehna, all lying in this Atak region, had all been provincial capitals, ranking with Nishapúr and Tús, under every Persian dynasty down to comparatively modern times; and although the Akháls in the course of the present generation had forcibly possessed themselves of the western portion of the Atak, no such disturbance of frontier had taken place east of Deregez, nor, as far as I was aware, had it been ever contemplated. I was thus not a little disconcerted at finding that M. Lessar, speaking no doubt with a knowledge of the views of the Russian Government, professed to regard the nationality of the Atak as an open question, and even suggested that the Persian mountain chiefs were oppressing the Tekké agricul-

turists by interfering with their water supply, rather than that the Turkomans were squatting upon Persian lands and infringing upon Persian rights. According, indeed, to present appearances, there is likely to be a repetition in an amended form of the old fable of the wolf and the lamb. The wolf desires a right of way through the fold, and the flocks, therefore, at present in possession will be declared to have no right to the lands.

But apart from all consideration of political questions, M. Lessar's report contains a vast amount of valuable information relating to statistics and geography. His remarks on the lower course of the Tejend go far to confirm the view which I have already ventilated on more than one occasion before this Society, that there was in very early times a large lake to the north of Sarakhs, which was fed by the Tejend, the Murghâb, the Persian streams from Kelât and Abiverd, and especially by the southern arm of the Oxus, then known by the name of the Aces or Ochus (modern *Ogoez*). This lake, which, like the lake of Seistan, fluctuated according to the influx from the rivers between a large open expanse of water and a mere reedy morass, was, according to my views, known to the ancients as the "Aria Palus," from which there was a water way to the Caspian.* When the southern stream of the Oxus, the principal feeder of the Aria Palus, was diverted to the northward the lake of course dried up, but the pools and lagoons which now occur along the course of the Tejend, together with the hard alluvial soil which is everywhere found a few feet below the drifting sand, are ample evidence of its former existence, and it is hardly extravagant to speculate that in the not very remote future, under skilful Russian engineering, those colossal irrigation works may be restored, the report of which excited the admiration of Herodotus and caused Pliny to describe the plain below Abiverd, as "fertilitatis inclitæ locus."† Another valuable notice, furnished by M. Lessar, and which is entirely new, refers to the name of Arakaj, applied to the country by the Persian inhabitants in lieu of the Turkish "Attok," or skirt. This is a real etymological discovery, for Arakaj, by retrenching the *j*, which is the usual dialectic termination of the old eastern Persian names, becomes Araka, or Araga, a name that nearly represents the Ragau of Isidore, joined with Abiverd, and further shows us that Raga, still used by the Afghans for "the skirt of a hill,"‡ really had that meaning in the old Persian language.§

* The Aria Palus of Ptolemy has hitherto been usually identified with the Lake of Seistan, but it must be observed that the river Αρειας (or Hari-rúd), coming from the Paropamisus, is made to flow northward into it; and that Ammianus adds "unde naviganti ad Caspium mare quingenta stadia numerantur et mille." The distance to the Caspian may be too short, but the direction certainly points to the Tejend swamp.

† Nat. Hist., vi. 16.

‡ I state this on the authority of Raverty, 'Afghan Papers,' p. 74.

§ The discovery that Raga or Arga is a genuine old Persian word for "the skirt of a hill" leads to many important explanations. It supplies a meaning for the old

Another etymological correction which I must offer whilst on this subject, refers to a statement in Colonel Stewart's paper of last year, which was allowed to pass at the time through inadvertence, and which has since, I fear, exposed us to the ridicule of our Russian critics. Colonel Stewart, it may be remembered, alluded to the many traces of Christian worship in Khorassan, and based his argument on the frequent occurrence of the word *Kilíseh*, "a church" (i. e. εκκλησια) in the modern nomenclature of the province. Having occasion lately to consult his paper in connection with M. Lessar's report, I was struck with this statement, and referred to the names quoted in support of it, when I at once perceived that he had confounded *Kilíseh*, "a church," with the colloquial Turkish *Kelesí*, "his fort," where the suffix of the third person is added to *Keleh*, "a fort," to individualise the name:— Khoja Kelesi, meaning merely "Khoja, his fort"; Khara Khan Kelesi, "Khara Khan, his fort," and so on. In one instance, that of Tepeh Kalísa at Julfán, in Deregez, Colonel Stewart may have been right in suspecting the remains of a Christian church, but in all his other examples he is on a false scent.

But M. Lessar's chief attention has been bestowed on the third section of the proposed Russian line between Sarakhs and Herat; and here his explorations have the merit not only of scientific accuracy, but of absolute novelty, for no European traveller has previously passed through this district of Badgheis, along the line of the Hari-rúd; nor is there any notice to be found in the Arab geographers of a high road of commerce having ever followed this particular direction. Badgheis, which comprises the entire region between the Murgháb and the Hari-rúd as far as the confines of the desert, has been always celebrated in the East for its sylvan character. The Pehlevi Bundehesh says "it is full of timber and full of trees," and the geographers specify among its products the poplar and plane and pistachio trees; but this description probably refers to the eastern portion of the province where it joined Baghshúr and Gharshistán on the upper Murgháb. When first invaded by the Arabs at the end of the seventh century of Christ, Badgheis was still held by the Hiyátheleh or White Huns, the Tokhari of an earlier age, who were themselves descended from the Hioung-nu and were the progenitors of the Ghúzor Turkomans.* It contained two

Median capital of Rhages (Arhagi of Strabo, p. 512), lying on the skirts of Elburz and joining Damghan, also derived from *Daman*, "a skirt." It further explains the Ragh of Badakhshan lying on the skirts of the Darwáz range, and possibly also the Arghassán (for Arghastán) of Afghanistan; and, finally, it suggests that the Ragha of the Vendidad, the twelfth place created by Ormazd, may be identified with the *Daman*, or skirts of the Suleiman range, associated as the name is in the Zend geographical list with Varena, or *Bannú* (Falani of the Chinese), and with "the Seven Rivers" or the Punjab.

* The chief argument in favour of a continuity of succession from the Hioung-nu to the Turkomans consists in the identity of the royal title used by this great Turkish tribe in its various changes of name and habitat. The *Chen-yu* or *Jen-yu* of the

cities, Baún and Bamyín, which were probably on the Kushk river or some of the smaller affluents of the Murghâb, as they were visited by the geographer Yacút on his passage from Herat to Merv; but all traces of them, as well as of the towns of Kulwin and Baghshúr,* captured by Jenghiz Khan, seem to have now vanished.

I have stated that there never was a high road through Badgheis along the line of the Hari-rúd. The immediate banks of the river were impracticable, and the north-western portion of the district away from the river was but poorly supplied with water. In describing, indeed, the cross-line which led from Sarakhs to Balkh, viâ Merv-er-rúd, Hamdullah expressly says that there was no running water for four stages, or about 100 miles, the robáts which had been erected for travellers along the route, and which faced the northern desert, being supplied by wells and cisterns.† The line throughout Badgheis further to the east, which connected Merv and Herat, and followed the affluents of the Murghâb, was far better supplied. That line, however, which was traversed and described by Abbott and Shakespeare in 1840–41, is outside of the present inquiry.

M. Lessar's route may be thus briefly described. Crossing the Hari-rúd at Sarakhs he follows the river more or less closely for 30 miles. He then makes a detour into the interior to the east, through a country entirely devoid of inhabitants, but with occasional wells and karezes, for 77½ miles, to the foot of the Barkhut Pass, by which the great Paropamisus range, here dwindled to insignificant hills 900 feet above the plain, is crossed. The ascent and descent of the pass do not measure more than a few miles, and the total remaining distance, from the robát north of the range to Kusán, the first permanent Afghan settlement, on

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Hioung-nu is thus constantly mentioned by the Chinese in the first century before Christ. The debris of this tribe, called by the Chinese *Tu-lo-ho* (i. c. Tokhari) afterwards occupied Tokharistán, and the Kharlukh chief of that district, who fought with the Arabs in A.D. 119, is thus named by Ibn Athir, *Jenuyeh* (vol. v. p. 148), while Biruni has left on record that in his time the same title (misread by Sachau as *Hanuta*) was borne by the Chief of the Ghuz-Turks, whom we know to be the same as the modern Turkomans. 'Chronology,' p. 109.

Yacút says distinctly that Badgheis had been the *Dar-el-Mulk*, or seat of government, of the Hiyátheleh, who moved there from Tokharistán; and it is probable that the Bundehesh alludes to this early settlement of Turks on the Upper Murghâb, in describing *Bakyir* (or *Bakeser* according to de Perron), the modern *Bagshúr*, as the stronghold of Afrasiab. See 'Sacred Books of the East,' vol. v. p. 38.

* The Bundehesh, in noticing this district, says that "in the days of Yim a myriad towns and cities were erected on its pleasant and prosperous territory."

† The names of these robáts intervening between Sarakhs and Merv-er-rúd on the Murghâb were—

	Fars.
Robát Ja'aferi	9
Mil-i-Omari	7
Robát-i-Abu Ma'ima	7
Diz Hindu or Kasari	7

Mokadassi gives the same route with slight variations.

the Hari-rúd and near the opening of the Herat plain, is only 37½ miles. At this point all difficulties cease and a carriage and four may be driven from Kusán to our outpost of Chaman at the Khojak Pass, north of Pishin.

A word, however, may now properly be said as to the territorial dependency of Badgheis. Although this tract, from Kusán as far north as the Turkoman desert, is at present entirely uninhabited, owing to the continuous raids of the Tekkes, the Saryks, and the Salyrs for the last twenty years, yet there can be no doubt that the whole of Badgheis is distinctly Afghan territory. The Persian frontier is demarcated by the line of the Hari-rúd. The Turkomans have no pretension to any land beyond the confines of the desert. It follows, therefore, that M. Lessar's route from Sarakhs to Kusán, and so on to Ghurián, was exclusively on Afghan soil, and that if a railway were to be constructed along the same line, it would thus, unless there were some specific convention to the contrary, be subject throughout to the jurisdiction of the Government of Herat.

When M. Lessar arrived at Kusán the main object, no doubt, of his journey was accomplished; but he seems to have had supplementary instructions to examine the western or Persian bank of the Hari-rúd, as well as the eastern or Afghan bank of the river, and he proceeded accordingly to Mash-had (Meshed), viâ Khaf and Turbat-i-Haidari for that purpose. This line of country, together with his return route from Mash-had as far as Turbat-i-Sheikh Jám has been so frequently travelled over and described by previous explorers, that M. Lessar's report conveys no novel information of interest; but between Turbat-i-Sheikh Jám and the Hari-rúd he is again on new ground. He examined the general course of the river from Kafir Kaleh and Pesh-Robát to the south, as far as Zúrabád and Pul-i-Khatún, where the Meshed river falls in, to the north, finding his way through the hills by mere foot-tracks and mountain paths, and the result of his reconnaissance being that there is no possibility of constructing a direct road for wheeled carriages, either along, or anywhere near, the river between Kusán and Pul-i-Khatún; either a detour must be made to the east into Badgheis to avoid the river gorges, or a still greater detour must be made to the west by Kehriz, Sheikh Jám, Lenkar, and Zúrabád. M. Lessar recurs, therefore, to his trace from Sarakhs by the Barkhut Pass to Kusán, as the natural and only possible line for a railway leading along the Atak from the present Russian frontier at Baba-Durmaz, by Sarakhs, to Herat; and on the general question, accordingly, of this line, I will now venture, in conclusion, to make a few remarks, taking advantage of the late ruling of our Chairman who said that provided party politics were eschewed, he saw no objection to observations or discussions of a more general character.

No one will question, then, but that the extension of the Russian arms to the east of the Caspian during the last twenty years has been

of immense benefit to the country; the substitution, indeed, of Russian rule for that of the Kirghiz, the Uzbegs, and the Turkomans throughout a large portion of Central Asia has been an unmixed blessing to humanity. The execrable slave trade, with all its concomitant horrors, has been abolished; brigandage has been suppressed, and Mahommedan fanaticism and cruelty have been generally mitigated and controlled. Commerce at the same time has been rendered more secure; local arts and manufactures have been encouraged, and the wants of the inhabitants have been everywhere more seriously regarded than is usual under Asiatic rulers. But although this picture is cheerful and reassuring, it does not by any means satisfy me that it is desirable to extend the sphere of Russia's beneficent action towards India, or that it is our duty, with a view to such a consummation, to assist and encourage M. Lessar's projected railway to Herat. Of course we are here merely discussing the question of principle. Practically it would seem to be premature to enter upon the discussion at all, for we are not within what is called measurable distance of the actual railway.

The mere finding the money for such an undertaking would be a difficulty of the first magnitude. Then, again, complications would certainly arise with the Persian and Afghan Governments if it were seriously proposed to run a foreign railway through their respective territories; and finally, the formal opposition of Great Britain would have to be encountered; for whichever party might be in power at the time, I cannot believe that in the present state of our relations in the East, the nation could ever be brought to look with indifference, still less with complacency, on a measure which, if successful, would destroy our prestige throughout Central Asia, and would further impair that feeling of rest and security within our own frontiers which is essential to the well-being of India, dependent as such well-being notoriously is on the peaceable development of the industrial and productive resources of the country.

It is quite possible, as in the case of the Suez Canal, that if India and Europe were connected by a continuous railway, even though that railway led through Russian territory, Great Britain, as the largest producing power in the world, would sooner or later obtain a lion's share of the traffic; but this result would not touch the question whether a mere increased facility of transporting merchandise and passengers had not been purchased at too heavy a political risk. It must be remembered that under such circumstances we should lose our boasted advantage of having no frontiers, and should be obliged to hold India in a constant state of preparedness for war. In fact the conditions of our tenure of the country would be entirely altered, not necessarily to our ultimate disadvantage, but still subject for the time being to uncertainties and liabilities with which no Government would willingly be hampered.

While therefore I humbly venture to congratulate Russia on the distinguished part which she has already played, and is probably destined to play in the future, in the civilisation of Central Asia, I cannot avoid recalling to mind with much satisfaction the political principle which she has so often avowed, and still I believe avows, that Afghanistan (including of course, the district of Badgheis), is beyond the scope of her influence and action; and finally, in thanking M. Lessar for his valuable report, and in expressing my admiration for the skill and daring with which he has executed the duties confided to him, I beg to be also permitted to say that I trust his project of a railway from Askabad viâ Sarakhs to Herat, may *not* be realised, or at any rate not until we have already constructed a railway to the same point from Sibi, viâ Quetta and Candahar.

On the termination of the paper and Sir H. Rawlinson's remarks,

The PRESIDENT said a letter had just been received from General Venukoff, the greatest living authority on the Geography and Ethnology of Central Asia. It was the intention of General Venukoff to have been present at the meeting, and to have taken part in the discussion; but, unfortunately, he had been prevented by illness. His letter was as follows:—

"MESSIEURS,—Le sujet de vos discussions d'aujourd'hui m'intéresse beaucoup. Mais je vous prie de ne pas attendre de ma part d'autres informations ou renseignements que purement géographiques: les questions politiques sont hors de mes préoccupations. Voici donc la copie de la carte, non-publiée encore, de l'oasis du Tejend et des routes qui traversent ce pays pour aboutir à Merv.* Cette carte est dressée par M. Aminoff, un des officiers d'état-major Russe des plus compétents dans les questions géographiques concernant l'Asie Centrale. Si vous voulez la reproduire dans vos excellents 'Proceedings,' je n'aurai qu'à la remettre aux mains de M. le Secrétaire de la Société; si non, je la publierai à Paris. Maintenant je dirai deux mots sur les travaux astronomiques, aussi non-publiés, de M. Gladycheff, un géodésien distingué, qui, à ce qu'il paraît, a visité Merv et la partie septentrionale du pays entre le Héri-roud et le Mourghâb. Nous lui devons les co-ordonnées astronomiques de Merv, de Ak-robat et de Haouz-i-khan. Il s'est aussi occupé des travaux topographiques; mais je ne connais pas encore leurs résultats. Vous voyez donc, Messieurs, que les pionniers russes dans l'Asie Centrale ne manquent pas de suivre l'exemple donné par leurs collégues britanniques et de marcher à leur rencontre. J'espère que cette rencontre aura lieu, un beau jour, dans les ramifications de l'Hindoukouch, où les anciens rivaux se tendront amicalement la main au nom de la civilisation et *des intérêts communs*. Je sais bien, Messieurs, que les traditions ou, pour dire plus franchement, les préjugés nationnaux, peuvent trouver mon opinion trop optimiste, irréalisable, même peu désirable; mais je suis sûr que le moment n'est pas loin où les agents politiques et commerciaux de la Russie et de l'Angleterre se rencontreront sur les bords du Héri-roud et dans la partie nord de l'Afghanistan. Cet opinion est le résultat de mes recherches géographiques et ethnographiques pendant plus de vingt-cinq ans. Vous trouverez les motifs de cette conviction sincère dans l'ouvrage que j'ai l'honneur de vous présenter ('La Russie et l'Orient').—On disait souvent que la Russie menace votre magnifique empire des Indes: j'espère que

* This map is published in the present number, p. 56, together with the one illustrating M. Lessar's routes, founded on a sketch also supplied by General Venukoff.—[ED.]

désormais on ne le dira plus. La Russie ne veut et ne peut vous menacer, Messieurs, et cela est tellement vrai qu'en 1872 les représentants russes à Téhéran ne s'occupaient point des terres qui s'étendent au nord du Khorassan, et ne savaient pas bien quelle est la rivière la plus septentrionale de ces deux : l'Attrek ou la Gurghène? En 1874, la chancellerie diplomatique de St. Pétersbourg ignorait aussi quel était l'état politique du Maïméneh : était-il indépendant ou vassal de l'émir de Kaboul ou de celui de Boukhara? Les envahisseurs, les conquérants n'agissent jamais de la sorte... Et de nos jours, le ministère des affaires étrangères de Russie,—à ce qu'il paraît,—ne savaient rien sur les explorations de MM. Lessar, Gladycheff, Alikhanoff, Sokoloff, Vychéslavtzeff, avant de lire les articles des journaux sur leur voyages intéressants. Est-ce le procédé des Napoléons, des Césars ou même des Moïses?—Soyez donc sûrs : la politique du gouvernement russe (si je la comprends bien) ne vous menace pas du tout. On a cherché, par tâtonnements, la frontière naturelle des possessions russes dans les steppes Asiatiques et on l'a trouvée déjà dans la plupart des cas : cette frontière naturelle passe à plusieurs centaines de milles au nord-ouest de l'Inde.—Craignez-vous la concurrence commerciale des Russes aux marchés Asiatiques? Eh bien, lisez le No. 310 de la *Gazette de Moscou* que j'ai l'honneur de mettre à votre disposition : vous y trouverez les raisons suffisantes pour calmer vos appréhensions.

"M. Venukoff."

Mr. O'Donovan said the starting-point of the Trans-Caspian railroad was at Mikhailovsk, near Krasnovodsk. He had spent many months in that district, and could vouch for the excellence of the harbour, and also for the very unproductive nature of the soil around it. Nothing but art and science had made it what it is. Not a drop of drinkable water can be found in the place, and it was only by transporting wood across the Caspian and distilling sea-water that it was possible to exist there. Between Mikhailovsk and Bami, where, as far as was at present known, the railroad terminated, there were no engineering difficulties as regards levels; but there were difficulties arising from the shifting nature of the marl-dust which, continually driven by the wind, accumulated upon the rails. It had been found necessary to construct a wooden palisading on either side of the line, just as in the Rocky Mountains a snow-guard had to be put up to prevent the trains being buried in snow-drift. From Bami there were no difficulties in the way of continuing the railroad eastward. The ground was as level as the floor of a house, and ample water was to be found all along the line. He often found too much water, for his horse was frequently knee-deep in the marshes and quagmires produced by the streams flowing from the hills. The population was a curious one. It was principally Kurd and Turkish. Two hundred and fifty years ago Shah Abbás the Great established, along the mountains between Askabad and Lutfabad, a Kurdish colony, to act as a buffer between the Persians and the wild tribes of the plain. Their descendants remained there still, and took great credit to themselves for being neither Persian nor Turkish. A little lower down, past Lutfabad, the Turkish tribes were found who had moved from the Oxus westward, and occupied Constantinople centuries ago. He had no definite information about the continuation of the tramway, but he thought the country offered no difficulties. Beyond Dushakh there was a perfectly level bank along both sides of the river Tejend. Though there were mountains intervening between the lower course of the Tejend and Herat, the river had engineered its own way through them. There was a peculiar point in connection with the Atak district beyond the mountains. Though the nomad Turkoman population were entirely opposed in religion and politics to the Shiites of Persia, still the latter had been able to keep them in subjection, because they held the

sources of the streams in the mountains, and could dam or turn these in different directions whenever they pleased. He need not, however, say that when the Russians hold the Atak the Persians would scarcely quarrel with them about the water-supply. Formerly the northern posts of Russia in Central Asia, near Orenburg and the Jaxartes, were separated from the countries further south by the great Kara-Kum desert—a desert not like those of Arabia, composed of siliceous sand, but having a covering of marl-dust, and devoid of water. It was formerly, as Sir Henry Rawlinson had described, a very fertile region, and there was doubtless a great central lake there. The line of communication from Mikhailovsk to Lutfabad turned that desert, and placed Russia in communication with Sarakhs, and would no doubt, later on, place her in communication with Herat. A junction at Merv, where a railway line from Bokhara would join that from Krasnovodsk, would enable the military resources of European and Asiatic Russia to unite, and be directed along the Sarakhs railway against the entrance of the Kandahar valley.

Sir Bartle Frere said that Sir Henry Rawlinson had for the last twenty years been telling his countrymen what now, for the first time, had been shown by actual exploration in the paper before the Society. Sir Henry had foreseen it, partly from his own observation and partly from his habit of always listening to those who had personal experience in that region. There was not a single fact which had been laid before them that evening that could not be found in Sir Henry's earliest remarks on the subject. It was a very striking thing that those points which, twenty years ago, were matters of doubtful inquiry for geographers, and could not be settled by the personal evidence of any European, had now become simply matters of topography in a country of which the geographical features were well ascertained. Railway surveys had now taken the place of geographical inferences. Whether Russians or Englishmen were talking on the subject, they were always looking forward to a time when the advance guards of the railway surveyors of the two nations would meet somewhere about that great chain of mountains which, as Sir Henry had told them, had now dwindled down to elevations of 900 feet. The Russians were doing their best to push forward their work of survey in the direction of Herat; but what was England doing? Since Sir Richard Temple pressed forward his railway in the neighbourhood of the Bolan Pass, what had England accomplished in the same direction? It seemed to him that whether Englishmen were able, as some optimists were, to throw to the winds any fear of aggressive action on the part of Russia, or whether they merely looked to the development of commerce, it behoved them to push forward their railway surveys towards the same points as the Russians, and probably the sooner the English railway engineers met the Russians, the further off would be the day when the military engineers would come into contact with one another.

Sir Henry Norman, after expressing his regret that Colonel Stewart and Sir Charles Macgregor were not present, said he did not entertain the dread which Sir Henry Rawlinson and Sir Bartle Frere entertained with regard to the advance of Russia. So far from desiring to push forward and meet the Russians in some unknown place, he, as a soldier, preferred to keep a secure base. He was quite sure that the meeting would not come in his time. He would rather that it should occur at a point where England would be able to bring all the immense resources of India into play, instead of pushing forward to Sarakhs or Herat, 600 miles beyond the frontier, by making railways that would cost an enormous sum of money, and never produce a penny of profit. He could not approve of that being done to meet some imaginary danger which our successors in the government of India would be perfectly able to encounter when the time came.

Sir Richard Temple said that he felt considerable embarrassment in addressing

the meeting from a consciousness that all this talk about geography and topography would be the merest sham if it were not for the deep political interests which underlay the discussion. He was precluded from saying what was at the bottom of his mind, in regard to these matters, because he could not do so without breaking the fundamental rules of the Society, which did not allow open discussion of political topics. Though they were bound to give every credit to Russia for all the great work she was doing they must remember that nations as well as individuals acted from mixed motives. He would not have thought it worth while to mention this were it not that so many of his countrymen, while bending their gaze upon the blessings which Russia was directly or indirectly conferring upon humanity, seemed to blind themselves to the political dangers which might menace their own empire. He had confidence enough in British administration and British influence to believe that whatever seriously lowered British prestige, or diminished British power in Asia, could not be for the good of humanity. He fully admitted that the evils of Turkoman slavery upon the Persian frontier were quite as great as those which Sir Henry Rawlinson had described. Nothing could exceed the horrors which the Turkomans had been practising, and if Wilberforce or Clarkson had been living at the present time no more touching theme could ever have inspired their eloquence than the slavery upon the Persian frontier. He was grieved that England had not borne its share in upholding the flag of freedom in that quarter, but sooner than that the work should not be done at all, for the sake of God and humanity, they must rejoice that it was done by Russia. But having accomplished that work, Russia, under conventions or state correspondences having the force of international agreements, was bound to stop at the frontier of Afghanistan. Inside the Afghan frontier there were none of those evils which existed on the border-land of the Persians and the Turkomans. Afghans were never carried into slavery, they were always able to take care of themselves, and therefore Russia had no right to cross the border. He entirely concurred with what had just fallen from Sir Henry Rawlinson. There were great difficulties in carrying railways into Afghanistan. In the first place they were prevented from doing so by international arrangements. Secondly, there were very great physical difficulties; for although the line of the Paropamisus at the Russian end of the line was very low, the line of the flanking mountains of Beluchistan at the English end was extremely difficult, and although information had recently been obtained as to the practicability of a railway through that part of the country, still that information showed that the cost of such an undertaking would be large. He quite agreed with Sir Henry Norman that our successors would be able to meet the difficulty, but at the same time, although we had a right to make a railway as far as Pishin on the frontier of Southern Afghanistan, it would probably be more expensive than those railways which had been referred to in the paper.

The PRESIDENT said that M. Lessar's paper had been read not on account of its political bearing, but for the interesting geographical facts it contained relating to the region between the Kushk and the Hari-rúd. As President of the Society he felt himself very much of a cosmopolitan. Sir Henry Rawlinson had made many wise and generous observations on the subject, but for the first time in history Sir Henry had described the Turkoman as a lamb, altogether ignorant of the fate that awaited it from the Russian wolf:

> "Pleased to the last he crops the flowery food,
> And licks the hand just raised to shed his blood."

It had been suggested that by raising opposition on the part of Persia and Afghanistan it might be possible to prevent a railway going to Herat. It was not for him to

say whether a railway through so wild and barbarous a country, among such people, ought in the interests of humanity to be stopped. There were occasions when we should rise above our position as mere Englishmen, and look at the general interests of mankind, and ask whether the barbarous state of those countries, inhabited by one of the most truculent races on the face of the globe, ought to be allowed to continue, in order to avert some possible danger from the British Empire. As President of the Society, as an Englishman, and as a man, he protested loudly against a doctrine which he thought was opposed to the real principles of humanity. It was the duty of the President of the Society to prevent the discussions taking too political a form, at the same time it was not desirable that he should exclude all reference to those political considerations which gave to geography one of its principal interests, any more than he should exclude reference to the commercial bearings of recent discoveries, or to ethnological facts. But all observations on such points should be kept in strict subordination to the primary interest of geographical science.

Notes of a Journey to the Imperial Mausolea, east of Peking.

By Frederick S. A. Bourne, of H.M. Consular Service in China.

The late Captain Gill, in the second chapter of 'The River of Golden Sand,' says: "Away to the back amongst these mountains" (behind a place called Ma-lan Yü to the east of Peking) "are the Imperial Tombs which, according to our informant here, cover a tract of country extending over seventeen mountains. The sacred ground is not enclosed by a wall, but being covered with forests abounding with game and wild beasts, and being entirely devoid of roads, the sanctity of the place is never invaded. Very little information could be obtained about the country or the position of the Tombs."

In January 1880 I was fortunate enough to get a very good view of these Mausolea. The weather was desperately cold and a heavy fall of snow dulled both the sight and the martial ardour of the guards who watch over the approaches to the enclosure, making access easier than usual. But before describing what I saw within the walls I will add something to Captain Gill's remarks on the route thither from Peking.

Travelling in a due easterly direction from Peking, after passing the district city of San-ho, we have a spur of the Tung-shan or Eastern Hills on the left, parallel with our road; the hills soon begin to close in on the right, and at Chi Chou (see 'River of Golden Sand' quoted above) we enter a valley running N.N.E., at the top of which the Tombs are situated.

A little to the south of Chi Chou there is a river, known as the Chi-yün Ho (or Chi Chou Grain Transport River), which, rising to the east of Tsun-hua Chou, flows in a due westerly direction as far as Chi Chou, where, a mile to the south of that city, it makes a sharp bend to the south, and after uniting with the San-ho river, flows into the Gulf of Pechili under the name of the Pei-t'ang river. It is now a stream of

little importance, but, like so many other water-courses on the Peking plain, it has had better days. In the reign of the Emperor K'ang-hsi (1662–1723) grain tribute from the southern provinces was shipped through the Grand Canal, up this river, and landed at Chi Chou, where the grain was stored in large granaries, and sent by cart to Peking. K'ang-hsi discontinued this route, and all tribute grain for the capital has since come by way of T'ung Chou.

After passing Hao-mên and Ma-shên-Ch'iao, the road makes a bend to the north, and we reach Shih-mên. Three miles more bring us to Hsin-ch'êng, and a further ride of eight li to Ma-lan Yü, mentioned above by Captain Gill, the largest town in the neighbourhood of the Tombs, and the place in which I proposed to reside during my stay.

On arriving here I sent for our landlord and asked him to find a guide to take me over the Tombs. He said that it was impossible. I should certainly not be allowed admittance. Foreigners had visited the place once or twice previously, but they had never ventured to enter the Mausolea enclosure. I should be turned back by the guards and my guide lose his head, &c., &c. I began to fear that my project would fall through, when one of our servants found a fellow townsman whose family had lately removed from Tientsin, and who undertook to act as guide so long as I kept outside the Mausolea enclosure.

During the following night it snowed heavily (for the north of China), and in the morning there was a foot of snow on the ground. I told the guide to take me to a hill which stands on the east outside the enclosure, and from which I hoped to get a distant view of the tomb of the late Emperor T'ung-chih. On the way to this hill I noticed a break of some feet in the outer or *fêng-shui* wall, described further on, where the foundation had sunk and the wall fallen in. On the inside of this break there was a tempting hill from the top of which it seemed we ought to get a near view of the above mentioned tomb. So, as I had received no official request to keep outside the enclosure, and as the natives were allowed to cross it on their way to a certain Lama temple, I ventured to disregard the admonition of my guide and to enter within the sacred precincts.

The Great Wall forms the northern boundary. At Ma-lan Chên, a military station at the north-east corner of the enclosure, three miles north of Ma-lan Yü, above mentioned, the Great Wall is met at right angles by a plain brick wall about nine feet high, called the *fêng-shui** wall, which encloses the ground set apart as specially sacred to the Imperial Dead. From Ma-lan Chên this wall runs nearly due south as far as Ma-lan Yü, after passing which place it curves slightly towards the west, and runs in a S.S.W. direction until it is opposite the small town of Hsin-ch'êng, a distance of five miles, where

* *Fêng-shui* means literally "wind and water," and thence the system of belief in the potent life of what we call inanimate nature, and in its influence on the fate of man.

it turns to the west. The eastern side of the enclosure is thus about five miles long. The snow barred access to the western side, but from the distances traversed within the wall I should think the width of the space enclosed, from east to west, must be also about five miles. The area of the inner enclosure would be, on this supposition, about 25 square miles or 16,000 acres. But besides this, a wide tract outside the boundary wall, with the ranges of hills on the south and south-west, belong to the Mausolea, and are forbidden ground. The *fêng-shui* wall only supplies a boundary when there is no natural one. It shuts off the valleys, but unlike the Great Wall, which seems to select the highest peaks and the most precipitous crags and boldly scale them, it does not ascend the hills.

Let the reader picture to himself a tract of country of this extent uninhabited and uncultivated. Within a wide circuit man is forbidden to build his dwelling or to bury his dead. Here it is that the rulers of China lie entombed. An Englishman is struck by the contrast between this abode of the Royal Dead and the last resting-place of the Sovereigns of his own country. The same honour and respect are intended but how different is their expression! Our English Sovereigns lie in a church, sacred to the God they worshipped in life, closely surrounded by the remains of the best and greatest of their subjects: these Eastern Monarchs sleep here alone, far removed from the abodes of men, with the heavens, the hills, and the streams, to them the embodiment of God, above and around them—a not unfitting contrast even in the tomb between the Head of a free people and an Autocrat.

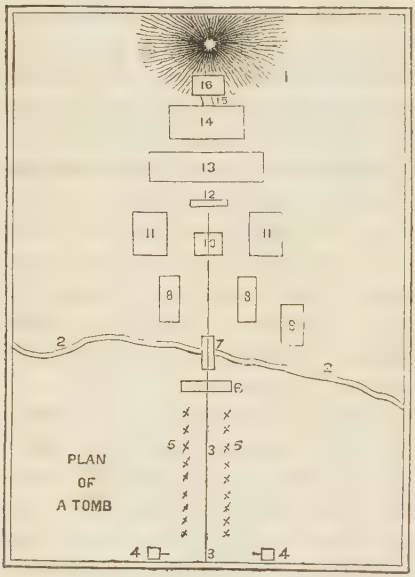
The place at which I first entered the *fêng-shui* wall was at a breach between Ma-lan Yü and Hsin-ch'êng. I advanced cautiously, but at first the guide declined to follow. When, however, he saw that I went on unmolested, although there was a guard station at the foot of the hill, he plucked up his courage and came, keeping always at a good distance. His company was indispensable, for the whole enclosure is so thickly wooded that no tomb can be seen from any other; and as there is no map of the place, I was completely dependent on him for guidance.

From the top of the hill, I saw just below me on the other side the Mausoleum of the late Emperor. Before, however, describing it particularly I will give a sketch of the features common to all the tombs.

The following Emperors are buried at this place:—

1. Shun-chih (1644–1662).
2. K'ang-hsi (1662–1723).
3. K'ien-lung (1736–1796).
4. Hsien-fêng (1851–1862).
5. T'ung-chih (1862–1875).

Their tombs are in all essential features precisely alike. Some appear to be built on a larger scale than others, but the disposition of the buildings is always the same. In the rear of each tomb is a hill (1—in the adjoining woodcut) on the southern slope of which the chamber that contains the coffin is built; and in front of all the buildings is a stream of water (2), running as nearly as possible east and west; these are features common to the site of every mausoleum, great or small, within the enclosure. Following the *Shên-tao*, Spirit's Road (3), as it is called, which approaches the tomb from the south, first come two lofty stone pillars (4), one on each side of the road; then figures of men and animals in pairs facing one another on opposite sides (5); next, an ornamental archway (6) and curving marble bridge (7) of several arches, with finely carved balustrade, crossing the stream. The reader will better understand the disposition of the buildings if he glance at the adjoining rough plan. After crossing the bridge, walking due north, we pass guard-houses (8) on either side, and on the right, sometimes to the south of the guard-houses and sometimes on their east, a sacrificial hall (9) in which the animals immolated to the Dead are slain. Further on we come to a small square building (10), open at the sides, in the centre of which stands, supported upon the back of a huge marble tortoise, the memorial tablet, on which is written an account of the "sacred deeds and virtues" of the Departed. On either side are halls (11), devoted to the use of officials who visit the tomb, that on the east or right being for civil and that on the west for military officers. After passing another (12), sometimes several, ornamental stone archways or doors, we reach the chapel (13), in which the worship of the Dead is carried on. Behind the chapel stands the most conspicuous building of all, called the Bright Pavilion (14), beneath which is the entrance to the tomb itself. Here is placed a memorial tablet, called the five-coloured tablet, on which the Emperor's name is engraved in Manchu and Chinese. Immediately behind this building and connected with it by a descending passage (15) is the "Earth Palace" (16) or tumulus, within which the coffin lies. At the interment of an Emperor, the coffin is placed upon a low hearse with wheels, and



rolled through this passage into the tumulus. It is there placed upon a stone ledge, or bed as it is called in Chinese, the hearse is removed, and the door shut. Behind the door, inside, there is a round hole, cut in the stone of the floor; and when the door is shut a large ball of stone follows it, and, falling into the hole, by its projecting top prevents the door from ever opening again. The door itself is of solid stone, and when once shut, it may be smashed to pieces by an exercise of sufficient force, but it cannot be opened. When this door has been shut the deceased Emperor is said "to be in peace for evermore."

The *fêng-shui* wall is pierced at several points on the east and south by small gates, through which pass the materials used in building and repairs, and all the traffic that is allowed. The main entrance is on the southern side. It is called the Great Red Gate, and is never opened except for the passage of an Emperor.

From this gate, which is nearly in the centre of the southern wall, a road leads due north straight up to the mausoleum of Shun-chih. This Emperor was the first of the Manchu princes who actually sat upon the Imperial throne of China, and may be considered the founder of the present dynasty. The earlier Manchu princes are buried at Moukden: Shun-chih is the first Manchu Emperor buried in Chinese soil, and his tomb therefore occupies the place of honour. This road, leading from the Great Gate in the southern wall to the tomb of Shun-chih, a distance of over three miles, is the main artery of the mausolea enclosure, and from it branch off the roads leading to the tombs of the later emperors, who, as our guide remarked, were but branches of the Imperial genealogical tree, and therefore the relation of their roads to that of Shun-chih, the main stem. It is a magnificent avenue, bordered on each side by groves of fir-trees planted at regular intervals. Our guide asked me triumphantly whether the requirements of *fêng-shui* were not perfectly fulfilled by this road. I was certainly impressed by its position and surroundings. To the north, straight in front, stood the snow-covered hills, under which the tomb of the founder of the dynasty is built; and to the south, in the line of the road, so that it exactly filled up the break in the trees, stood another hill, four or five miles distant, but from the singularity of its position with regard to the road seeming to be as much a part of the tomb as the monstrous stone figures of men and animals that guard the road on either side, some standing, others crouching. Behind the stone figures the groves of fir-trees were alive with birds of many species, to whom this forbidden ground gives shelter.

The stone figures * which guard the road deserve a more particular notice. There are 18 pairs, or 36 in all, each pair placed facing one

* The writer is indebted for much of what follows on the subject of these stone figures to an interesting paper printed in the Journal of the Shanghai Branch of the Royal Asiatic Society for 1878, by the late W. F. Mayers, called "On the Stone Figures at Chinese Tombs and the offering of Living Sacrifices."

another, one on either side of the road. Walking towards the tomb from the south we see two lofty stone pillars, one on either side of the road, about two feet from the top of which a cross-piece of stone points inwards towards the road. These pillars are called *wang chu*, or "sign-posts," and their object is to direct the spirit of the deceased when wandering from its earthly resting-place back to the tomb. Between these pillars and the ornamental archway the figures are placed at equal distances. Next to the pillars come the figures of beasts. They are monolithic, and appeared to be of about the same size as those at the Ming tombs, one of the figures at which—the elephant—was measured by Dr. Edkins, who gives the dimensions as 13 feet high, 7 feet wide, and 14 feet long. There are two pairs of each of the following animals, one pair *couchant*, and one pair standing:—*Suan-ni* * (lion), camel, horse, elephant, *Shih* * (lion), and *Ch'i-lin* (unicorn). After the animals come three pairs of civil and three pairs of military officials; the former in court robes, and the latter in armour.

Compared with these figures those in front of the tombs of K'ang-hsi and K'ien-lung are insignificant, both in size and number. Those that guard Hsien-fêng's tomb are even smaller, and the approach to T'ung-chih's tomb is without them altogether.

With regard to the object or meaning of these figures the reader is referred to the interesting article by Mr. Mayers mentioned above. It appears that long before the Christian era the Chinese believed in the existence of a fabulous monster called *Wang-hsiang* or *Yün*, addicted to devouring the liver and brains of the dead. In order to protect a grave from the ravages of this ghoul an exorcist was employed at the burial of the great, who was thought able by certain charms to secure the grave against the assaults of the monster. Later it became customary to erect a stone effigy of such an exorcist outside the tomb, giving to the image by an easy step the same power that was supposed to belong to the original.

The pomp and extravagance affected by the princes of the Ch'in dynasty (255–206 B.C.) led to the immolation of men and animals at the tombs of the great; and this practice may have suggested the figures, which should bear the same relation to the dead body as the ghosts of the immolated, sent to serve in the other world, did to the departed spirit; either or both of the above reasons may have given rise to the custom. But the obvious meaning of the figures to Chinese of the present day is a representation at the tomb of the pomp and state of the palace. The Chinese believe that the spirit of the dead is for a time bound to the tomb in which the body lies. What could then be more natural than the endeavour to give to the dead, at least in appearance,

* Both lion. *Suan-ni* is the traditional lion with head uplifted as if in the act of roaring. *Shih* was the name given to the lion when the Chinese became actually acquainted with it, and this is the word always used now for the real animal.

the splendour due to the living? In short, as a Chinese whom I questioned on the subject put it, the stone figures are to a dead Emperor what the pageantry and display of a court are to a living one.

The Ching Ling or Tomb of the Emperor K'ang-hsi is on the east of the main road, and the Yü Ling or Tomb of the Emperor K'ien-lung on the west, both to the north of the enclosure.

On the east of the main road, close to the southern corner, is the *Hui Ling* or mausoleum in which the Emperor T'ung-chih, the last occupant of the throne, and his Empress are buried. It differs in nothing from the ordinary plan except that there are no stone figures. The young Emperor and Empress are buried together beneath the same tumulus. One of the imperial concubines is buried in a separate tomb, roofed with green tiles in contrast to the yellow tiles of the main building, on the western side.

A mile or so from this tomb is the *Chao-hsi Ling*, the mausoleum in which the Empress of T'ai Tsung and mother of Shun-chih is buried. She came to the south with her son and died in Peking, about the year 1688. This tomb has been lately repaired. The following is given as the reason why she was not buried at Moukden with her royal consort, T'ai Tsung. They say that when her coffin had been carried as far as the Great Wall, it was found impossible to carry it further in the direction of Manchuria. No matter how many men were ordered to carry it, move the coffin would not. The emperor K'ang-hsi accordingly came to the conclusion that his late grandmother had a strong objection to being buried in the north, and he caused this tomb to be constructed.

The mausoleum prepared for the present Empresses regent is on the west of the main road. It is only just complete, and has cost the Government six million taels, or about 1,500,000*l.* The site was chosen by the Empresses themselves when on a visit to the tombs in 1873. This mausoleum is spoken of officially by a euphemism as "the happy land for ten thousand years." As in the case of T'ung-chih's tomb, the stone figures are wanting. After crossing the marble bridge the road divides, and there is a separate approach to the east and west half of the building. On the eastern side the senior Empress, known as the Eastern Empress from the position of her apartments in the palace at Peking, will be buried; and the junior Empress, who for a similar reason is known as the Western Empress, on the western side. The buildings of this mausoleum appeared to be particularly well constructed; they are raised three feet above the ground on a platform composed of magnificent blocks of stone, and have altogether a look of solidity and thoroughness in construction rarely seen in modern Chinese architecture. In front of the buildings, on each side of the approach, artificial mounds have been raised, which are planted with young fir-trees, brought down from Manchuria for the purpose.

Not far to the south-west is the Ting Ling, or Tomb of Hsien-fêng, who died in 1861, and whose consorts the present Empresses regent were. There are only five pairs of stone figures in front of this tomb, and they are most diminutive. From their insignificance here, and their absence altogether from the tomb of T'ung-chih, one is led to suppose that the Chinese in the present day are unable to produce these figures, either for want of stone of proper dimensions, or of the skilled labour required.

North-west of T'ung-chih's tomb, on the banks of the stream that runs in front of it, is the site of a mausoleum that was built for the Emperor Tao-kuang (1820–1850), and afterwards destroyed under curious circumstances. According to Chinese custom, the representatives of consecutive generations should be buried alternately on the east and west sides of the family cemetery. To apply this principle to the Imperial Tombs, a site was selected about two days' journey to the west of Peking, that might correspond to the west of a private cemetery, as the tombs under consideration do to the east. Yung-chêng was the first emperor buried in the western tombs; his successor, K'ien-lung, was buried in the east; the next Emperor, Chia-ching, in the west; and a tomb for his successor, Tao-kuang, was constructed at the eastern inclosure.* This tomb, as usual, was prepared before the death of the Emperor. By the direction of a Grand Secretary, named Ying-ho, the elaborate and costly drainage arrangements, which formed a part of the plan, were omitted, by which Ying-ho is said to have made 100,000 taels or 30,000*l*. The Empress died first, and was buried in the tomb, but the stone door was not finally closed until the Emperor should join her. On one of the Emperor's visits to sacrifice at the Tombs he expressed a wish to see his own future resting-place. On his ordering the stone door to be opened, that he might enter the tumulus itself, he was horrified to see that there were some feet of water in the chamber—enough to reach the level of the stone bed on which the coffin lay. Ying-ho was banished, and his possessions forfeited. The Emperor decreed that a new mausoleum should be constructed at the western tombs, 180 miles off. The building was razed to the ground; some of the materials were removed to the new site, but the greater part were left, and we noticed pieces of chastely-carved stone, that formerly belonged to this tomb, carelessly thrown together to form extempore bridges. There are not wanting believers in *fêng-shui* who attribute the misfortunes of the present dynasty, even the untimely death of the late Emperor, to this untoward incident, and the mistake made in changing the site of this tomb.

* Tao-kuang being buried at the western, his successor, Hsien-fêng, was interred at the eastern tombs. The late emperor T'ung-chih ought therefore to have been buried at the western tombs; but when he visited them shortly before his death he is said to have expressed such a dislike to the place that the rule was neglected, and he was buried here.

Ample provision has been made for the protection and maintenance in repair of the tombs. Besides an office of works at Shih-mên, there is a regular number of men, varying from 10 to 40, attached to each mausoleum, as carpenters, blacksmiths, gardeners, sweepers away of snow and dust, &c. There are large barracks in different parts of the enclosure for Manchu guards, and at Ma-lan Chên 1000 Chinese troops are stationed. All the troops, Manchu and Chinese, are under the charge of a commandant, who resides at Ma-lan Chên.

The pay of artificers and troops is as usual very small, and as usual they make up the deficiency in ways prejudicial to their employers. This they do by cutting wood from the hills on the north of the inclosure, and by shooting and snaring the game. Cutting wood within the inclosure and selling it for fuel was his only means of subsistence, our guide told us. In the hills on the north there is plenty of game—pheasants and deer,—besides wolves, leopards, and monkeys.* On the level ground to the south I put up hare, quail, and duck. It is strictly forbidden under penalty of death to destroy any living thing or to cut wood within the inclosure. Yet pheasants were on sale in the streets which every one knew had been shot there. We were prevented by the snow from going into the hills, but in some rough ground we passed over, we noticed the lairs of wolves, and the tracks of their feet in the snow, and a Ma-lan Yü man was bitten by a leopard on the night before my arrival—proofs of the existence of large game.

Five miles to the east of Ma-lan Yü, at a temple called Fu Ch'üan Ssŭ, there is a hot spring. There is a large bath in the temple, and the water is believed by the natives to possess valuable medicinal qualities. It has been analysed by M. Billequin, Professor of Chemistry in the Peking College, with the following result: In one litre of water there are 0·732 grammes of constant constituents, of which 0·15 is sulphur-natron, 0·382 sulphate of soda (Glauber's salts, NaO, SO_3), 0·118 sulphate of lime (CaO, SO_3), and 0·081 of salts of chlorine and the alkaline carbonates; temperature R. 45. Dr. Bretschneider, in his interesting account of the Peking Plain, says:—"The Emperor K'ang-hsi bathed here often. Tradition says that Hua-t'o, one of the most celebrated Chinese physicians, in the third century A.D., lived here, and recommended the use of the water to his patients.

* This monkey is said to be a new species. Dr. Bushell, physician to H. B. M. Legation, Peking, has obtained a specimen.

GEOGRAPHICAL NOTES.

Departure of Mr. Joseph Thomson.—Mr. Thomson left England for Zanzibar by the British India Company's steamer *Navarino*, on the 13th of December. The precise route to be taken by his expedition is not yet fixed and will depend on the result of preliminary inquiries he will make on the coast; but he will aim at accomplishing both the chief objects of the enterprise, namely, the exploration of a direct route to the eastern shores of Victoria Nyanza and the examination of Mount Kenia. The Society are indebted to Mr. W. Mackinnon, Chairman of the British India Steam Navigation Company, for his accustomed liberal concession with regard to Mr. Thomson's passage, and to Mr. John Pender, Chairman of the Eastern Telegraph Company, for offering to transmit free all telegrams relating to the expedition. Her Majesty's Government have also aided, as on several former similar occasions, by supplying the arms for the native escort of the expedition.

Mr. Thomson will be preceded in the same region by a German expedition under Dr. Fischer, a former companion of the Messrs. Denhardt in their exploration of the river Dana; but this expedition will follow a different route from that of our English traveller. According to the latest news (November 12th), Dr. Fischer was organising his party at Pangani, intending to proceed to Mount Kilimanjaro. He had engaged 300 men, all but eight having had previous experience in caravan travelling in the Masai country.

Recent News from Lake Nyassa and Neighbourhood.—Letters received last month by the Free Church Missionary Society describe a visit of the marauding Magwangwara to the eastern shores of Lake Nyassa. The same, or another, war party of this tribe attacked and destroyed the Universities' Mission village Msasi, north of the Rovuma river, more than 300 miles distant from the lake, in September, whilst the visit to Nyassa appears to have been in August. The letters state that the mission steamer *Ilala*, commanded by Captain Gowans, crossed the lake from Bandawe to Ngoi with supplies for the Rev. W. P. Johnson at the end of August, returning with Mr. Johnson, who was ill of fever, on the 1st of September. They further say that when the Magwangwara appeared near his station making raids on the villages, Mr. Johnson paid them a visit and learnt that the attacking party had been driven south by another tribe, and that there was turmoil in the country behind the Livingstone Mountains. The *Ilala* had recently encountered one of the fearful storms for which Lake Nyassa is famous. It occurred whilst the steamer was at anchor off Bandawe, and lasted through one night and far into the next day, the heavy seas breaking over the vessel and her anchors dragging half a mile, notwithstanding that she was steaming ahead all the time to ease the stress on her cables.

Portuguese Expedition to Umzeila's Country.—Two Portuguese naval officers, Lieut. Cardoso and Dr. Franco, left Mozambique, in September, to conduct an expedition to Umzeila's. They were to be joined by another officer at Inhambane. The exact nature and object of this mission is not given out, but it is believed to be partly political and partly geographical. Some amicable settlement with Umzeila is necessary if the country is to be explored, and mines worked in the neighbourhood of Manica, by the company started by Captain Paiva de Andrada, and probably the chief end of Lieut. Cardoso's journey is to endeavour to bring this about. It is this officer's intention, after leaving Umzeila's, to cross to Senna, on the Zambesi, and to visit the Nyassa district; but by the time he reaches Senna the season will be far advanced, and the rains heavily set in.

Dr. Junker on the Welle.—Since our last notice of Dr. Junker's journey to the Welle,* that indefatigable explorer has continued his work with unchecked perseverance and considerable success. He returned to his headquarters at Ndoruma's residence on December 3rd, 1880, and immediately prepared for a second expedition, on which he started on January 7th, 1881. It was his intention to penetrate as far as the residence of Bakangai, a powerful Zandeh chief, to the south of the Welle. He reached the mountainous country of the A-Madí, and actually crossed the Welle in February, but his further progress was stopped by the A-Mezimá, a sub-tribe of the A-Báramba. Despoiled of nearly the whole of his outfit he was forced to return to the A-Madí, among whom, owing to the disturbed condition of the country to the south, he spent weary months in enforced idleness. In the beginning of 1881 several chiefs of Egyptian posts established in the Monbuttu or Mangbáttu country, had thought fit to attack Mambangá, a nephew of Schweinfurth's King Munza, so cruelly done to death by Yusuf-Pasha. Mambangá resisted the aggressors and took away from them fifty rifles, appealing at the same time to Dr. Junker, whom he had befriended in 1880, to interfere on his behalf. Dr. Junker, however, who had been granted many facilities by the Egyptian authorities, felt constrained to observe a neutral attitude. When Colonel Hauash reached the Welle with reinforcements, Mambangá sought safety in flight. Hauash established himself in a stockade on the western boundary of the Monbuttu country, close to Mambangá's old residence, and not far from the spot where Dr. Junker had crossed the Welle in September 1880 (lat. 3° 45′ N., long. 27° E.). He, too, invited Dr. Junker to act the part of a peacemaker, and our traveller accepted this invitation all the more willingly, as it would afford him an opportunity of having an interview with the Italian traveller Casati, who had then recently arrived in this region. On his road from the A-Madí country he came to a part of the Welle,

* 'Proceedings,' 1881, p. 301.

where that river forms numerous islands, inhabited by the Embatá (a Monbuttu tribe), and is bounded by picturesque mountains. A few days before his arrival at the Egyptian stockade, Mambangá had unwisely made an attack upon it, and although this assault was beaten back, and severe loss inflicted upon the enemy, Col. Hauash felt, that with the eighty musketeers at his command, and an insufficient supply of ammunition, he would not be able to hold his ground for any length of time. He, therefore, appealed to Dr. Junker to bring about a reconciliation. Mambangá readily granted an interview, but stedfastly refused to go to the Egyptian stockade, for his soothsayers predicted that his doing so would prove disastrous. Dr. Junker's assurance that times had changed, and that the Egyptian government earnestly desired to live on friendly terms with the native chiefs, and would in case of need defend them against aggressors, found no credence. Much time was spent in this way in futile palavers. In November the expected reinforcements under Rahid Bey arrived at length, and Mambangá fled to the westward. A small expedition at once started in pursuit of the fugitives, who were overtaken and dispersed. This expedition Dr. Junker accompanied. For four days they travelled along the southern bank of the Welle, past the islands of the Embatá, who found themselves attacked in their strongholds by an auxiliary flotilla of Baginze from the Upper Welle, and as far as the country of the A-Mezimá, who had robbed Dr. Junker in February 1881, and were now called upon to make restitution of the property they had stolen. Two days further to the westward, in about lat. 4° N., long. 26° E., the Welle receives a considerable tributary from the south, which figures as Nomayo on Dr. Schweinfurth's map, but the real name of which is Bomokándi. Dr. Junker tells us that Welle and Nomayo both mean river, the one in the language of the Niam-niam or Zandeh, the other in that of the Monbuttu. The real name of the Welle is Mákua. The country between the Mákua and Bomokándi, to the west of the Monbuttu, is inhabited by the A-Bárambo, a negro tribe, governed by Zandeh chiefs. To the west of them, beyond the Bomokándi and along the south bank of the Mákua live the A-Babúa, who speak a language akin to that of the Monbuttu. On reaching the A-Mezimá country, Dr. Junker at once sent messengers and presents to the chief Bakangai, who lives four days to the south. They returned in the course of five days with a chimpanzee and a few tusks of ivory as a return present. The permission sought for was granted, and Dr. Junker started at once. Two days brought him to the Bomokándi, one day beyond which he came to Bakangai's residence. After a ten days' journey thence in an easterly direction he reached Kanna's, where he turned to the northward, towards Tangasi, near Munza's old residence, where he arrived in February last, and once more met Captain Casati. From Tangasi Dr. Junker removed to the Zeriba Kubbi, three days to the east, whence he started on a circular

trip to Gango, and the head of the Gádda river in the Momvú country. Soon after his return, on March 26th, he once more left Kubbi, this time in a southerly direction, his intention being to visit Mbélia and Sánga, two brothers of Munza, who live beyond the upper Bomokándi, known to the Momvú as Meri. From this trip Dr. Junker expected to be back in April, and his supplies being quite exhausted, he will be unable to await the arrival of Emin Bey, and will at once return to Ndoruma's territory in the north. Before coming home to Europe Dr. Junker proposes to visit the region stretching away to the westward, beyond Ndoruma's and Sasa's territories, which may enable him to settle the vexed question of the lower course of the Mákua. "If native information can be trusted," so says Dr. Junker, "there can be no doubt that the Mákua is the head stream of the Shari, whilst the Nepoko, a river rising far to the east and flowing in a southerly direction, is Stanley's Aruwimi," and consequently a tributary of the Congo. Dr. Junker refers somewhat vaguely to a large lake to the south of the regions explored by him, and his preliminary accounts, together with information obtained by former explorers, enable us to fix with a considerable amount of confidence the position of the lake Key el Aby referred to in the interesting communication of Mr. Lupton in the last number of our 'Proceedings.' * Rafai, who is Mr. Lupton's informant, is no stranger to African geographers, for his station (or one of them) was visited by Dr. Potagos, and he is repeatedly referred to in Dr. Junker's reports. There can be no doubt that Mr. Lupton's Bahr el Makwar is identical with the Mákua, which Rafai must have crossed some distance below its confluence with the Bomokándi. Crossing at this spot Rafai would have come into the country of the Babúa, easily recognised as Mr. Lupton's Barboa. The lake is said to lie at a distance of fourteen days' journey to the S.S.W. of the Mákua ferry, and allowing a daily progress of nine geographical miles, its position would be in about lat. 2° N., long. 25° E., or within a hundred miles of the Congo. The articles of European manufacture obtained by the Babúa from the people on the eastern side of the lake probably reach them through the Arabs established at Nyangwe, whose presence Dr. Junker tells us is known in the countries recently crossed by him. The alternative name for the Mákua given by Mr. Lupton, viz. Bahr el Warshal, reminds us of Dr. Potagos' Ushal, which is said frequently to expand into lakes. Mr. Lupton is not, however, the first who refers to the existence of a large lake in this part of Africa. On a map published by Count Escayrac de Lauture in 1855, we find figured a lake Koey-dabo, which discharges the Shari to the westward and the Kuan to the north-eastward, in the direction of the Nile. More definite is the information obtained by Poncet, Heuglin, and Miani. Poncet's Birket Metuasi is

* See p. 685. Compare *Mittheilungen*, 1882, pp. 423, 441. It is from the *Mittheilungen*, *L'Esploratore* and *L'Exploration* that we have derived the above information on Dr Junker's latest doings.

described as an expansion of the Welle; Heuglin's 'Immeasurable lake is said to lie five days to the south of the river of Sena, which is the same as the Mákua, whilst Miani's large lake is situated to the south-west of Bakangai's, in lat. 2° 30′ N. Its shores are said to be inhabited by Gango, north of whom live the Babúa.

The French on the Niger.—When the project of a railway across the Sahara to Timbuktu was definitely given up, the attention of the French Government was concentrated upon the development of the Senegambian possessions. Already, in 1862, General Faidherbe, one of the ablest governors ever placed at the head of a French colony, had advocated an advance to the Niger. The political events which soon afterwards absorbed the whole energies of France, caused this project to be shelved, and it is only within the last few years that efforts are being made towards its realisation. In 1879, Captain Gallieni secured the permission of the native chief to construct a fort at Bafulabe, on the Bafing (lat. 13° 47′ N., long. 10° 49′ W.). In the following year he started for the Niger, and although plundered by the Bambara before he reached that river, he courageously continued his journey into the territory of Ahmadu, the successor of the fanatic Haj Omar, king of Segu; and on March 10th, 1881, after a long detention in the country, he induced that monarch to sign a treaty, by which his kingdom was placed under the protection of France. Whilst Gallieni was still absent on this mission, Colonel Borgnis-Desbordes left St. Louis with a body of troops, and on February 7th, 1881, occupied Kita, an important position half-way between Bafulabe and the Niger, in lat. 13° 3′ N., long. 9° 27′ W., and at an elevation of 1175 feet above the sea. A second expedition, under the same leader, started in 1881, and on January 7th, 1882, reached Kita, where the garrison had suffered much from the unhealthiness of the site selected for strategical reasons. Just then a new prophet, Samory, was preying upon the peaceable Malinke on the right bank of the Niger. The inhabitants of Keniera (lat. 11° N., long. 8° 40′ W.) appealed to the French for help, but before the detachment despatched for their relief could reach them, their village had been taken and its inhabitants killed, or carried into slavery. Samory's army dispersed on the first cannon-shot, but the small French force was nevertheless compelled to withdraw, harassed during its retreat by the enemy's horsemen. To wipe out this undignified retreat, and to gain a firm footing on the Niger, a third expedition, once more under the lead of Colonel Borgnis-Desbordes, has been organised, and is by this time preparing to start from the Upper Senegal. Dr. Bayol will act as its precursor, by seeking alliances in Kaarta and Segu. The military expeditionary corps consists of two companies of marines, three companies of native Tirailleurs, a battery of artillery, and a troop of Spahis, and numbers about 1000 men. It is destined for Bamaku, on the Niger, where a fort will be built and a flotilla of armed steamers launched, the engines for which are being

carried there from France. Simultaneously with the troops a railway corps of 1500 men has been despatched, under M. Jacquier, who will continue the construction of a railway which is to connect Kai, or Kayes, at the head of navigation on the Senegal, near Medina, with Kita and the Niger. This railway was begun last year, but, owing to the sickness among engineers and labourers, but little progress has as yet been made. The total length of this line will be over 300 miles, and 342,000*l.* were last year voted towards its cost by the French Chambers. The railway from Dakar to St. Louis was to have been proceeded with in the course of November, notwithstanding the opposition offered by the Damel of Kayor.

Baines, the African Traveller.—A marble tablet to the memory of the late Thomas Baines is about to be erected in the parish church at Durban, where this enthusiastic and persevering African traveller was well known and respected. The inscription is as follows :—"To the memory of Thomas Baines, F.R.G.S., the artist and traveller, who explored a great part of the South African interior and Western Australia, portraying the scenery and the native life of these countries with rare fidelity and graphic power, by pen and pencil, and who endeared himself to his many friends by the unselfishness, simplicity, and nobility of his character. He was born at Lynn, Norfolk, England, in 1822, and died at Durban, Natal, on the 8th of April, 1875. This tablet was erected by his old and sorrowing friend, Robert White, formerly of Graham's Town, now of London."

Gold Coast Inland Topography. — A despatch from Mr. Alfred Moloney, Administrator of the Gold Coast Colony, dated Accra, Aug. 8th last (a copy of which is in the Society's library), contains a report by Mr. Chas. W. Thompson, Assistant Inspector of the local constabulary, upon his journey of 123 miles from Accra to Prahsue, viâ Insabang and Insuaim, returning to Elmina by Acroful, Abracampah, and Assayboo. This report supplies details of some 60 miles of previously unknown country between Insabang and the Prah, including the course of that river north of Cocochinchin ; it also corroborates previous ideas as to the richness in gold of Aguna and Western Akim, and the importance of developing the economic botany of the colony ; and it affords further instances of the loss of power by the chiefs of the protected territories. —Mr. Thompson left Accra on June 4th last, and followed the coast past fishing villages to the Seccoom, shortly after crossing which he struck inland in a north-westerly direction, entering the Goomoah country, and finding the forest gradually more dense as he left the coast. Many streams were crossed, but the first of any importance was the Aynsue, which was then (in the dry season) 25 feet wide and $2\frac{1}{2}$ feet deep, being 20 feet deep and 60 feet wide when full. At the neighbouring village of Asafu, gold is collected in the street gutters after rains, and

Mr. Thompson himself saw about four grains found on the previous day.—The Acora is another fine stream, 20 feet wide and three feet deep, and at Aguna Swaydra, on its right bank, fine specimens of auriferous quartz from Quabin were seen. Insabang, the capital of Aguna, and residence of King Kofi Chintor, was reached on June 8th, and found to contain 160 houses, though half were unoccupied and falling into decay. It is situated on a sloping rock of soft red soapy stone, through which streaks of quartz crop up in well-defined east and west lines. Starting from Insabang on June 10th, and still striking north, Mr. Thompson crossed the boundary between Aguna and Akim, and after passing various streams and villages, came to Asuboah, which is noticeable for producing a very large kind of snail highly prized as an article of diet in the neighbourhood. Mansue, further north, was found to be a fine open town of some 230 houses, with gold in the villages near it; and Insuaim or Insuayem, the capital and residence of Atah Fuah, King of Western Akim, which was reached after crossing various streams and approached through continuous plantations, is still larger, having wide streets of some 400 small houses, built on a slope facing north at the confluence of the Afotosue and Birrim rivers. Farming is here the sole industry; palm oil and juniper berries are sent away largely, and Hussas visit the town to purchase the cola nut, which flourishes in the district, and was frequently met with on the road from the coast. The Birrim river, even in the dry season, was uniformly six feet deep and 30 yards wide, with a current of two miles an hour; it was stated to attain a great velocity in the rains, and to be then over 25 feet deep. It was apparently navigable at Insuaim, not only for canoes but light boats; but the natives declared that there were many places completely blocked with fallen trees and snags.—Leaving Insuaim on June 15th, the journey northwards to the Prah was continued, across some dozen small rivers and streams flowing west, and past various villages to Iribee, a remarkably filthy town, near which quantities of gum were collected, and a tree was observed, the bark of which is found efficacious by the natives in the treatment of sprains, &c. No rubber was observed during any part of the journey, but a very tenacious gum is used as a bird-lime by the natives. Up to this point the road from Accra is stated to be practicable for hammock travelling, and is believed so to continue up to Beronassie, but Mr. Thompson only speaks from report, as he turned westward by a bush path to the Prah. He found that the fine broad river "Animie" marked in Butler's map of Akim as a tributary of the latter river, most certainly does not exist south of Iribee, nor do the people there know of such a river, though there is a small stream to the north called Annanah. Arrived at the Prah, at Pahooroodoo, it was found to be 60 feet wide, 10 feet deep in the middle, full of rocks, and with a current running three miles an hour. The natives cross it by hauling on to a rope of plaited reeds suspended from bank to bank, having no canoes, but using floating logs instead. Mr. Thompson

followed the river by a tortuous bush path, much encumbered by trees and parasitic growth, and after crossing four streams bridged by lines of poles on single uprights, and passing three villages where no white man had ever before been, according to the natives, arrived at the deserted village of Cocochinchin, on the right bank of the Prah, which he forded, finding it 114 feet wide. An attempt to clear a path to strike southwards from Eggwinassie, a short distance below Cocochinchin, was frustrated by an attack of fever, and Mr. Thompson was compelled to make for Prahsue by the direct track; but his survey and observations on the river from Pahooroodoo to Eggwinassie supply new particulars of its course: and as he carefully paced the whole distance from Insabang, and very frequently observed the bearings of the road, he claims a fair degree of accuracy for this portion of his sketch map, which is practically new ground. This map (scale $2\frac{3}{4}$ miles to the inch) accompanies the Report, with a route-table showing villages, distances, number of houses, chiefs, water supply, &c., supplementing the numerous topographical details in the Report itself.

Survey of the Ancobra River and Axim Gold District.—Commander R. Murray Rumsey, R.N., in another Report (of which a copy has been supplied to the library by the Colonial Office), dated August 9th last, has supplied details of a piece of work likely to be of considerable utility in the development of the gold region of Axim. Having made a rough survey of the entrance of the Ancobra, he started up it in a steam pinnace on July 17th, and after passing Akanko and Tomento, reached the confluence of the Bonsah on the next day, but was then unable to follow the latter river on account of its being blocked by newly fallen trees. Having returned to Tomento and sent back the pinnace to Axim, he continued his journey by land. From his observations, it appears that the Ancobra from its mouth to Akanko averages 80 to 100 yards in width, and the soundings in mid stream when the river is high would be from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms. Beyond Akanko, the river gradually narrows, and at Tomento, 25 miles further up, it is about 35 or 40 yards wide, but still of a good depth, and were it not for the numerous fallen trees and some rocks above Inframangio, would be navigable still further by any vessel that could cross the bar at its mouth. It rises to its full state about June, and is low again in September (ranging from 25 to 30 feet between the two conditions), thus peculiarly differing from the Volta, which is not full until September, and then falls more gradually, not getting to its lowest state until the following May. This is apparently to be accounted for by the fact that the Ancobra and its chief tributary the Bonsah are supplied chiefly from the small streams which abound some 50 or 60 miles from its mouth, and are consequently affected by the purely coast seasons, rising in the rains and falling as soon as they are over; whereas the Volta receives its supply further inland and is dependent on the seasons in the interior. Commander Rumsey struck across country through thick

forest from Tomento on the east bank of the river to the Bonsah, finding in the valleys distinct indications of recent heavy floods. The Bonsah itself was then 25 yards wide and eight feet deep in mid stream, with a current of two miles an hour; but when the heavy rains set in, the waters rise to the top of its banks, which are from 20 to 25 feet high. From the village of Bonsah (or Apankroom) to Tarquah, the centre of the gold district, the road lay through country of a like nature to that previously traversed, and apparently consisting of a succession of ridges running north and south in two parallel lines coursing east and west. The general features of the country about Tarquah itself consist of two ranges 200 to 300 feet above sea-level, running in a north-east and south-west direction for 12 or 14 miles, and about a mile apart. The town is in the valley between these ridges, and the mines are mostly on the eastern one of them, the workable quartz reef probably extending along the entire length of the western face of that range. Commander Rumsey enumerates the various working companies and discusses their concessions, &c., pointing out that the great difficulty of transport from the coast might be well removed by the Gold Coast Government undertaking a road, to be kept up by a carrying-tax. Should this be done, he thinks that Inframangio, 3½ miles south of Tomento on the left bank of the Ancobra, would be the best starting-point, the road being made thence through Bonsah. He also points out the conflicting native jurisdictions in Wassaw and Opinto, and suggests means for settling districts. The Report is accompanied by charts of the mouth of the Ancobra (400 feet to the inch), and of its course to the Bonsah junction (1800 yards to the inch), both with soundings; also by a sketch survey of the gold-mining district from Tomento to Tarquah (including Crockerville), on the latter scale, and a copy of the map to J. Bonnat's concession; also by an appendix enumerating the native chiefs of Wassaw and Opinto and their territories, and a list of villages and distances.

Present State of Easter Island.—This remote outlying member of the Polynesian island-groups, so remarkable for its stone sculptures and remains of native architecture, was visited in June last by Commander Bouverie F. Clark, in H.M.S. *Sappho*. We cull the following details of geographical and ethnological interest from the Report * which this officer has addressed to Admiral Lyons on the subject:—The *Sappho* sighted the island on the 17th day from Coquimbo, and anchored on the evening of the same day in Cook Bay. On passing the village of Malaveri, the English flag was seen hoisted on a lofty flagstaff, and shortly after landing, the vessel was boarded by Mr. Alexander Salmon, the agent of the "Maison Brander" of Tahiti, who now owns the greater part of the island; from him, during the two days' stay of the vessel, Commander Clark obtained the information he had to give regarding the island, information the more valuable inasmuch as Mr. Salmon is a perfect master of the native

* Communicated to the R. G. S. by direction of the Admiralty.

language. The Maison Brander four years ago purchased the property of the missionaries on the island, who then left for the Gambier Archipelago, taking about 300 of the natives with them. A large grazing farm was thereupon established, and there are now about 10,000 sheep and 400 head of cattle on the island; the flocks increasing very rapidly as there are two and sometimes three lambing seasons in the year. With the present number of sheep Mr. Salmon gets about 18 tons of wool per annum. There are enormous numbers of poultry in the island in a semi-wild state, but all owned by the natives; in fact a fleet could easily be supplied with fresh provisions, except vegetables; but as yams, sweet potatoes, bananas, and plantains grow readily, they also could be supplied in time. Water is the only scarce article. The natives now remaining are only 150 in number, and they are rather decreasing than increasing. About 500 were shipped to Tahiti some eight years ago to work on the plantations of the Maison Brander, besides the 300 removed by the missionaries. Among these remaining people there are no traces of the missionaries' work; they have no religion at all, are expert thieves, and very revengeful; they never forget or forgive, although in general good-tempered. They are divided into several small clans, amongst which strength or personal courage is the only claim to superiority, and their chief quarrels arise over the efforts of each clan to secure the first eggs of the "wide-awake" every year from Needle rock, to which they attach a superstitious value. As there is a heavy surf at the bottom of the cliffs opposite the rock, several lives are lost nearly every year while they are seeking for the eggs. The result of Mr. Salmon's repeated talks with the natives on the subject of their first arrival on the island is to find that they all say they originally landed on the north side at Anakena, and came from the *east* in two canoes, provisioned with yams, taro, and sweet potatoes, the king (by name Hotometva, or the "Prolific Father") in one canoe, the queen in the other. On making the land they separated, passing round in opposite directions and meeting again at Anakena, where they landed and settled on Mount Topaze, of which the native name is Hoto-iti. They there built the stone houses, the remains of which still exist, and made the statues with which the hill is covered; but the first statue was not made till some fifty years after they landed. The natives say the original name of the island was not Rapanui but Te-pito-fenva, i. e. the land in the middle of the sea. Commander Clark was much struck with the evident fertility of the soil. If it was only cultivated he believed it would produce magnificent crops, and it seemed to him especially adapted for the culture of vines. The extinct volcano of Te Rama Kao on the south-west corner of the island is well worthy of a visit. The bottom of the crater is not level as described by a former visitor, on the contrary there is no bottom at 50 fathoms in the centre, but there is a carpet of decayed vegetation spread over the water on which one can cross from side to side.

REPORT OF THE EVENING MEETINGS, SESSION 1882–3.

Second Meeting, 27*th November*, 1882.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*William Joseph d'Ewes Andrew, Esq.; F. H. Beaumont, Esq.; George W. Brackenridge, Esq.; William Francis Bridges, Esq.; Albert Carey, Esq.; Edward F. Clifton, Esq.; Gerald Cuthbert, Esq.; Edward Camden Daniell, Esq.; Col. George De Prée; William Ford Ewings, Esq.; Rev. Charles Farrar Forster; Samuel Robert Groom, Esq.; Alfred Edwin Harris, Esq.; George William Harrison, Esq.; Thomas Percy Hearne, Esq.; William B. Irvine, Esq.; John Keefe, Esq.; Louis Bert de Lamarre, Esq.; Frank Lupton, Esq.; Duncan George Forbes Macdonald, Esq.; Gilbert John McCaul, Esq.; John McKillop, Esq.; George Mansell, Esq.; Arthur J. Marshall, Esq.; Sir James Marshall; H. B. Morse, Esq.; Arthur Oakes, Esq.*, M.D.; *Rev. Charles Martyn Reed; H. Beresford Robinson, Esq.; David Ross, Esq.*, C.I.E.; *Juan Domingo St. George Savinon, Esq.; John L. Stanley, Esq.; Rev. Henry Pelham Stokes; George Stronach, Esq.*, M.A.; *Major R. N. Sutton; Rev. E. F. Taylor; S. Nugent Townshend, Esq.; Alfred Bond Trestrail, Esq.; John Tuck, Esq.*, M.D.; *Charles William White, Esq.*

The following were the subjects of the evening:—

1. "M. P. M. Lessar's Second Journey in the Turkoman Country:—Askabad to Ghurian, near Herat." (Translated and abridged from the author's narrative in the *Golos* newspaper of St. Petersburg, and read by Mr. D. W. Freshfield, Secretary.)

2. "Remarks on M. Lessar's Survey." By Major-General Sir H. C. Rawlinson, K.C.B.

For both papers and the discussion, *vide ante* p. 1.

Third Meeting, 11*th December*, 1882.—General Sir J. H. Lefroy, R.A., K.C.M.G., Vice-President, in the Chair.

Elections.—*Major-General Richard D. Ardagh; Isambard Brunel, Esq.; Richard Eve, Esq.; Dr. J. J. Lamprey; James H. Mitcheson, Esq.*

Previous to the reading of the paper, the Chairman (Sir Henry Lefroy), announced that the Council had made final arrangements by which Mr. Joseph Thomson would leave England in a few days, to enter upon a new and very adventurous course of travel in Central Africa. There was no one present who was not aware of the courage, energy, and ability with which Mr. Thomson assumed the responsibility that devolved upon him by the death of his leader in the former expedition, the late eminent geographer, Mr. Keith Johnston. That he should again be ready to embark upon a course of travel which was certainly more extensive and more novel, and fraught with still greater difficulties, was a matter in which they could not but take a deep interest, and he would not be doing justice either to the Council or to the Members of the Society, if he were not to take this opportunity of wishing to Mr. Thomson the success which his courage and enterprise deserved, and which, he trusted, would bring him back to this country in two years' time with great increase of information.

The following paper was then read:—

"Explorations in Guatemala, and Examination of the old Indian cities, Tikal and Usumacinta." By A. P. Maudslay, Esq.

Will be published, with map and illustrations, in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—December 1st, 1882: M. H. Duveyrier in the Chair.—The committee charged with the arrangements for the third German Geographical Congress, intended to be held on the 29th, 30th, and 31st March, 1883, at Frankfort, sent the programme of the congress, which will be accompanied, as before, by an exhibition of geographical objects.—M. Ferd. de Lesseps presented the third volume of 'L'Histoire Universelle,' by M. Marius Fontane, relating to Egypt, and said that the work shows that the early history of the Egyptian people furnishes useful information for our guidance in the present, and that it should be consulted in order to know exactly the necessities of the present time in Egypt, and to foresee the exigencies of the future; he added that he would like this volume to be read by those who before the civilised world have assumed the responsibilities of the destiny of modern Egypt. He would repeat to the Society what he had said on this subject to the deputation of English trades unionists:—"It would be a great honour for England if, after having established order in Egypt, she preserved Egypt for the Egyptians. As your fellow-countrymen are in Egypt, let me tell you that the Egyptian people (as their history teaches) are sure of regaining their autonomy, and absorb the race which seeks to subdue them." M. de Lesseps then gave an account of M. de Brazza's reception by the Municipal Council of Paris, who awarded the traveller a gold medal at this ceremony, which took place lately, and which he attended as delegate from the Society. He explained that M. de Brazza had been sent by the French Committee of the "International African Association" to establish civilising stations in Africa, and these having been established they had been handed over to the French Government, by consent of the King of the Belgians, the founder and President of the Association. This transfer of the French stations to the Government took place before the presentation and ratification by the Chambers of the treaty between M. de Brazza and King Makoko. He reminded the Society that an interest in geography was an old tradition of the Parisian Municipality; for when the expedition of La Pérouse was equipped, King Louis XVI. communicated to the "Hôtel de Ville" the instructions which were given to the celebrated navigator. He (M. de Lesseps) had reason to know this circumstance, inasmuch as his father was a member of the expedition. It was Barthélémy de Lesseps who brought to Europe the last news of the expedition which ended soon after so unfortunately.—Colonel Venukoff then informed the Meeting that Colonel Prejévalsky intends starting next March on his fourth journey into Central Asia; although suffering from a complaint in his eyes, he is superintending the printing of the account of his third journey in the Asiatic deserts, which will appear in January 1883, with maps and drawings. He announced also the publication of a map of the Oasis of the Tejend and the routes leading thence to Merv, and stated that, after three journeys made this year in Central Asia, M. Lessar had returned to Askabad. He had fixed the position of Merv. Its altitude does not exceed 880 feet.—It was announced that a paper had been received on the tribes inhabiting the mountains which separate Tong-king from the Me-kong, never yet visited by a traveller, through Abbé Lesserteur, Director of the College of Foreign Missions in Paris.—A proof of the map of Bahr-el-Abiad (White Nile), prepared by Arnaud-Bey from his own surveys and astronomical observations taken in 1840–41–42, was laid on the table.—M. Mattéi, Consular Agent at Brass, wrote on the 22nd November that he had just gone up the Niger as far as Lukoja. He had seen King Ahmadou, who has a large territory on the right bank of the Benué. Captain Paul Sorin, who was sent to Cambodia, intimates that he has begun a map of the

ruins, Angkor being the centre; the region extending over a conside.able space.—It was announced that the Society had received news from Dr. Bayol, who arrived at St. Louis (Senegal) on 31st October, and who immediately organised his caravan, composed of twenty-two natives. It was expected that he would start for the interior about the 15th November. M. Desbordes was on his way to the Kayes district, where he will organise the expeditionary column charged with the establishment of a post at Bamaku near the Niger. The chief Samory was said to be again preparing to harass the French. At Cayor the state of things remained the same; the Damel will not have a railway constructed on his territory, and is believed to be ready to oppose it by all the means in his power, and if defeated, will burn all the villages in his retreat and cut off the French communications with the coast.—The meeting terminated by the reading of a paper by M. Victor Guérin, on the expedition of which he had lately charge in Egypt and the Lebanon.

——— Second General Meeting, December 15th: M. Ferdinand de Lesseps in the Chair.—The meeting was held in the large hall of the Sorbonne. In opening the business, M. de Lesseps delivered a brief address, in which he dwelt particularly on the greatly increased interest in geography which had been manifested of late years in France, an interest which continues to grow from day to day, and which being founded on public opinion imposes new duties on the Society. He said the Society must follow the current and conform to the wishes of the majority. One of the first tasks it must undertake is to reconstitute the "Fonds des Voyages," a fund which was exhausted in 1875, since which time the Society has not been able to give material aid to geographical explorations in distant countries. The restoration of the fund will perhaps be difficult, the resources of the Society being limited, but he was one of those whom difficulties attracted rather than discouraged. In conclusion, he announced his intention of submitting to the Council a plan by which he hoped they would be able to attain the desired end.—The General Secretary, M. Chas. Maunoir, then read the Annual Report which he had prepared, on the labours of the Society and the progress of the geographical sciences during the past year. He said that the number of members is continually increasing, and that at the end of 1882 it had reached 2250. This increase would necessitate various ameliorations which would be carried into effect gradually. Already the library (books and maps) has been completely reorganised, under the direction of the new librarian, M. J. Jackson, who has succeeded the Abbé Durand. In the second part of his report M. Maunoir passed in review the more important geographical events of the year, and on its conclusion the President complimented him on the zeal and thoroughness with which he had fulfilled his duties for so many years. The Report was ordered to be printed in the quarterly *Bulletin* of the Society. —M. Desiré Charnay then read his paper, previously announced, on "The Monuments of Yucatan and the country of the Lacandons"; which consisted of a narrative of the voyage he made in Central America in pursuance of a mission with which he was charged by the Minister of Public Instruction. The mission had been also supported by the contributions of a rich American of New York, M. Pierre Lorillard. It had for object the study, in Mexico as well as in Central America, of all the remains of temples, palaces, vases, inscriptions, &c., calculated to throw light upon the age and origin of the indigenous American civilisation. M. Charnay gave it as his opinion that these civilisations had all one and the same origin, and that they are offshoots of the Toltec, for he considers the Toltec tribe as a type of all the tribes of the same race and same language which invaded Mexico and a part of Central America from the seventh to the fourteenth centuries. He believes that the civilisation of Mexico was chiefly Toltec, especially in its industry, its arts, and in the decorative part of its monuments. The monuments that he has examined in

Central America are derived from the same source; but he (M. Charnay) is far from attributing to them the antiquity that some travellers have assigned to them, viz. of 2000 to 3000 and even 10,000 years, and believes them, at least those of Yucatan, to be no older than the commencement or middle of the fifteenth century. M. Charnay exhibited to the Meeting photographs of the ruins projected on a screen by means of the oxyhydrogen light (on Molteni's system). He showed first of all the ruins of Aké, one of the oldest places in Yucatan, where the monuments consist of eighteen to twenty ruined pyramids, some of which are still surmounted by fragments of important superstructure. According to M. Charnay, Aké is a most interesting place, inasmuch as it is there we may see the primitive style of construction of the ancient inhabitants, which the traveller has designated as the "cement" epoch, and which belongs to the time when Palenque existed. Chichenitza, on the contrary, belongs to a more modern epoch, viz. that of hewn stone. Chichenitza was the first post occupied by the Spaniards on their entry into the peninsula in 1527, and was one of the important centres of Yucatan, the term "centre" being more accurate than that of "town," as the groups of dwellings and palaces in Yucatan have nothing in common with a town as we understand it; they are composed generally of palaces of the prince and the caciques, temples, and public buildings scattered without apparent order over a vast space, with cabins of servants and slaves in the intervals. The best preserved palace in the place is that called "Palace of the Nuns"; it is of three storeys, and has a richly sculptured façade, carved from top to bottom like a Chinese ivory casket. The door is of grand architectural effect. The palaces are ranged on massive terraces and have outside staircases. There is besides a so-called castle and other buildings, and the "tennis court" elaborately ornate, with pillars carved with bas-reliefs. After leaving Yucatan, M. Charnay proceeded to the country of the Lacandons. He had heard from the mahogany-cutters of the existence of ancient towns in the forest, which they came upon in the course of their distant wanderings. Arrived at the locality of one of these ancient cities, which he has named "Lorillard City" in honour of the generous American who has supported his expedition, M. Charnay found there a young Englishman already established at the ruins, Mr. Alfred Maudslay. This gentleman was travelling as a tourist, not as an archæologist, and was willing to leave to M. Charnay all the honours of the discovery; but the latter would not accept the generous offer, and prefers to share with Mr. Maudslay the glory of having explored these extensive and wonderful remains of old Indian architecture. The site of the town is in about 17° N. lat., on the left bank of the Usumacinta, on the boundaries of Guatemala and the two Mexican provinces Chiapas and Tabasco. The numerous edifices, temples, and palaces in ruins here found resemble much those which M. Charnay had formerly discovered at Palenque. There is great resemblance between the two in the nature of the materials employed, the arrangement of the interiors, and the decoration. Nearly the same characters are also seen in the inscriptions and bas-reliefs. In one temple the ornamentation must have been exceedingly rich, to judge by the stone panels which seem to contain gigantic figures. The great stone slabs of Palenque carved with inscriptions and bas-reliefs are not met with here, being replaced by lintels of doors which were covered with superb sculpture, but they are now in such a dilapidated condition that little use could be made of them. Still M. Charnay collected several fine specimens.

Geographical Society of St. Petersburg.—October 18th, 1882 [second Report]: M. P. Semenof, Vice-President, in the Chair.—[In addition to the brief notice previously given of the third address delivered by M. Miklukho-Maclay at this meeting, we publish the following ampler details which we find in the stenographic report of the lecture, contributed to the newspapers of St. Petersburg on

November 25th. The appearance of this report, as well as the next one, was delayed by an illness of the lecturer, who was anxious to revise them himself before their publication.]—In March 1873 M. Miklukho-Maclay made a short visit to the Philippine Islands, in order to settle a question raised by Karl Baer as to the brachycephaly of the Negrito aborigines of the islands. During a five days' stay at Manilla, the Russian traveller visited the Mariveles mountains, and made there several anthropological measurements. The Philippine Negritos proved, in fact, to be brachycephalic, but otherwise very much like the Papuans of New Guinea. In their customs, however, they have much in common with the Melanesians of the South Pacific.—In August 1874 M. Miklukho-Maclay began a series of journeys in the interior of the peninsula of Malacca. He started from Johore, accompanied by thirty men ordered for that purpose by the Maharajah of Johore, and carrying with him a letter by which the Maharajah enjoined his subjects to help the traveller in his undertaking. In exchange for this help, the Russian traveller was bound to draw a map of the dominions of the Maharajah. He crossed twice the Johore country—from west to east, and from north to south. He reached, first, the mouth of the Moar river, then ascended it in a flat boat as far as its confluence with the Palong, followed up this last, and, crossing the hills at its source, reached the China Sea at the mouth of the Endau river. Thence he proceeded south to the Selat-tambrau Strait, which separates Singapore island from the mainland, the whole journey occupying fifty days. Travelling was very difficult. The rainy season had set in; the plains and woods were inundated, and the party had to walk in water that reached as high as the knees and sometimes the breast. During this journey, M. Miklukho-Maclay had an opportunity of making a close acquaintance with the "Forest-men" ("Orang-outangs" in Malayan language; *orang* signifying "men," and *outang* the forests; the Malayans say: *orang bukit* for "men of the hills," *orang-laut* for "men of the sea-coast," and so on). They are a very primitive tribe, leading a wandering life in the woods. They are a mixed race, arising from the crossing of Papuans with Malays and partly with Melanesians, who have been driven from the sea-coast into the forests of the interior by the Malays and Chinese.—A severe fever contracted by M. Miklukho-Maclay during this journey induced him to take advantage of the invitation of Sir Andrew Clarke, Governor of Singapore, and to embark with him for Bangkok. At Bangkok he was fortunate in getting a letter from the king to his vassal subjects in the peninsula of Malacca, recommending them to assist the Russian traveller during his further journeys in the peninsula. With this powerful recommendation, he undertook a most adventurous journey, on foot, from Johore to Siam. He had to encounter great distrust on the part of the small rulers of the peninsula; but each of them being anxious to send away the white traveller as soon as possible to the dominions of the next ruler, M. Miklukho-Maclay succeeded in his undertaking, and reached Siam after a 176 days' journey. The ethnographical results of this most interesting exploration (which enabled him finally to make close acquaintance with pure representatives of the Melanesian race in the Orang-sakays, who inhabit the mountains at the sources of the Paghan river) were published, in German, in the scientific periodicals of Java, and translated into English in the 'Journal of the Straits Branch of the Asiatic Society' for 1878 and 1879.

——— October 20th: M. P. Semenof, Vice-President, in the Chair.—The meeting took place again in the lecture-hall of the Solanoy Gorodok, for the delivery of the fourth address of M. Miklukho-Maclay. The lecturer gave an account of his travels among the islands of the Malayan archipelago, Micronesia, and Melanesia, and of his scientific work in Australia. After a short visit to Java, to the Moluccas, and to the northern part of Celebes (already mentioned in the first address), he

stayed for some time in 1874 at Amboyna, and on the islands Ceram-Laut. In the Dutch colonies scattered over these islands, he had, of course, much greater facilities for anthropological studies than in New Guinea, and was enabled to make anthropological collections and numerous photographs of great value, the majority of which are now at Sydney.—In 1876 he visited several islands of Western Micronesia, and came to the conclusion that, however much the Micronesian race may resemble the Polynesians, it is still mixed to a great extent with the Melanesian, which mixture appears in the structure of the hair, in the colour of the skin, and so on. On the islands Lub, or Hermit, he found a hybrid race produced by the crossing of Melanesians with Micronesians; the next group Escheker, or Eshikie, being inhabited by pure Micronesians, the boundary-line of the straight-haired Micronesian race passes thus through this group.—In 1879 he left Sydney, on board an American schooner, and cruised for thirteen months among the islands of Melanesia, landing at New Caledonia, the Loyalty Islands, the New Hebrides, and the Admiralty Islands where he stayed for two months on shore and learned the language of the natives. The results of this important cruise being too numerous to be told in the course of one evening (they were published in the 'Isvestia' of the Russian Geographical Society and in the 'Sitzungsberichte' of the Berlin Anthropological Society for 1881), M. Miklukho-Maclay mentioned only the most important of them, namely, the brachycephalism of many inhabitants of the Melanesian islands (New Hebrides, Solomon, Louisiades, and several others). It was proved by numerous measurements.—Returned to Australia, M. Miklukho-Maclay landed first at Somerset, then followed the eastern coast, and made some excursions in the interior of the mainland, in order to study the natives in their natural state, and thus throw some light on the much-debated question as to the origin of the black Australian race. Without giving a definite answer on this subject, the Russian explorer is inclined to admit the opinion of Professor Huxley, and to consider them as an independent race *sui generis*, which is neither Papuan nor Polynesian. The lecturer mentioned then his interesting studies of the comparative anatomy of the brains of Australians, Malayans, Melanesians, and Mongolians—for which studies he had many opportunities at Brisbane and Sydney—as well as his researches into the comparative anatomy of the brains of marsupials, and his successful endeavours to open a biological station at Sydney, with the help of the Linnean Society of New South Wales and of the Government. He concluded by expressing thanks to all those persons and institutions who had assisted him and enabled him to fulfil to a certain extent the task he had undertaken.—The Chairman expressed the thanks of the Geographical Society and of all persons present for the interesting addresses they had heard, and for the explanations given by the lecturer during the morning *conversazioni*. The Russian Society would always be grateful to the traveller for his bold and persevering efforts.—The scientific results of these remarkable travels will be published in Russian, the Emperor having granted for that purpose the sum of 2200*l*.

Geographical Society of Stockholm.—October 20th, 1882: Professor Aug. Fries, President, in the Chair.—The President stated, that in consequence of Dr. Stuxberg's removal to Gothenburg, E. W. Dahlgren, Esq. (of the Kongl. Biblioteket, Stockholm), had been appointed Secretary *pro tem.* He also announced the receipt of a collection of ethnographical and natural history objects from Consul W. Kopsen in the Fijis, and concluded by welcoming among his *confrères* the English member, Mr. John Evans, F.R.S., who was present.—Dr. Montelius then gave an account of a visit he had made this summer to study the archæology of Great Britain. He had visited the British and South Kensington Museums, Mr. John Evans' collection at Nash Mills, Mr. Grenvell's in Durham, and the museums

at York, Salisbury, Oxford, Edinburgh, and Dublin; and photos of a large number of interesting objects in these places were shown by the speaker. He considered the bronze age of the British Isles of great importance, and bespoke a high degree of culture, while nearly all the objects were, from their appearance, made in the country. This fact refuted the theory advanced by many scientists, that these objects were brought from South Europe to the Northern countries, including Scandinavia. He also pointed out the remarkable circumstance, that hardly any bronze objects found in Great Britain were of Scandinavian origin, which was still further at variance with the above theory, while also showing that little intercourse existed at that period (about 1000 years B.C.) between the two nations, and there was only a single object in existence which could with certainty be said to have been brought from England to Scandinavia in that age, viz. a gold ornament found in Seeland. But from the Viking era there were many proofs of frequent intercourse, and the Scandinavian art of ornamentation of this period was greatly influenced thereby, which circumstance became of far greater importance, when Professor Sophus Bugge's opinion, that the Northern mythology was of Irish origin, was borne in mind. The speaker considered that Stonehenge was raised for the worship of the sun. He concluded by referring to the hive-shaped cairns in Ireland, Scotland, and the Orkneys, in which latter place he had seen one which had been plundered by Vikings, the walls being covered by their Runic inscriptions.—Professor H. Hildebrand next read a paper on the development and ornamentation of early forms of culture.—Captain N. Selander, in conclusion, exhibited a map of Sweden drawn by him, and now being published; scale 1:500,000, which is of special importance, as being the first map fixing correctly the position of the Island of Gotland in the Baltic, in relation to the Swedish coast, as by Mr. Hellström's map, made in 1832, from which all subsequent ones had been drawn, it was laid 160,000 feet too far from the coast, a circumstance discovered last year by triangular measurements.

NEW BOOKS.

(By E. C. RYE, *Librarian* R.G.S.)

EUROPE.

Leclercq, Jules.—La Terre de Glace. Féroë, Islande, Les Geysers, Le Mont Hékla. Paris (Plon): 1883, 12mo., pp. 320, map, illustrations. (*Williams & Norgate*: price 3*s.* 6*d.*)

The maps are from our 'Proceedings,' and the illustrations from photographs brought from Iceland by the author, whose little work is above the average of its series.

Rütimeyer, L.—Die Bretagne. Schilderungen aus Natur und Volk. Basel, &c. (Georg): 1883, 12mo., pp. 153. (*Williams & Norgate*: price 3*s.*)

Schweiger-Lerchenfeld, Amand von.—Griechenland in Wort and Bild. Eine Schilderung des Hellenischen Königreiches. Leipzig (Schmidt und Günther): 1882, large 4to., pp. xiv. and 224, 200 illustrations. (*Williams & Norgate*: price 2*l.*)

To be noticed solely for its illustrations, many of which give excellent representations of physical conditions.

Schweiger-Lerchenfeld, Amand von.—Die Adria. Land- und See-fahrten im Bereiche des Adriatischen Meeres. Wien, Pest, Leipzig (Hartleben): 1883, 8vo., pp. 792, map, plans, illustrations. (*Williams & Norgate:* price 13*s.* 6*d.*)

The complete work is now issued, and gives a well illustrated account of the geographical and general features of the lands bordering on the Adriatic. The map is by Gustav Freytag (scale 1 : 1,500,000) and contains, besides the Adriatic coasts of Italy, Istria, Croatia, Dalmatia, the Herzegóvina, Montenegro, and Albania, insets of the Bocche di Cattaro (scale 1 : 160,000) and of the Venice Lagoons (scale 1 : 300,000).

Tissot, Victor.—La Hongrie, de l'Adriatique au Danube. Impressions de Voyage. Paris (Plon): 1883, 4to., pp. 412, map, plates, &c. (*Williams & Norgate:* price 17*s.*)

Chiefly to be noticed for the number of its illustrations, some of which render the aspects of the country well.

ASIA.

Bastian, A.—Völkerstämme am Brahmaputra und verwandtschaftliche Nachbarn. Reise-Ergebnisse und Studien. Berlin (Dümmler's Verlagsbuchhandlung): 1883, 8vo., pp. lxix. and 130. Plates. [No Index.] (*Williams & Norgate:* price 6*s.*)

Almost entirely of ethnographical interest.

Haeckel, Ernst.—Indische Reisebriefe. Berlin (Paetel): 1883, 8vo., pp. xi. and 355. [No Index.] (*Williams & Norgate:* price 10*s.*)

The well-known Jena naturalist here describes his experiences in Ceylon, with some introductory and concluding observations on the journey to and return from that island. Zoological and botanical points of course receive special attention from him.

AMERICA.

De Robiano [Le Comte] Eugène.—Chili. Le Chili, L'Araucanie, Le détroit de Magellan, et retour par le Sénégal. Paris (Plon): 1882, 12mo., pp. 267. (*Williams & Norgate:* price 2*s.* 6*d.*)

Forms a sequel to the same author's work "Dix-huit mois dans l'Amérique du Sud." Of no geographical interest.

Hudson, T. S.—A Scamper through America, or Fifteen thousand miles of Ocean and Continent in Sixty days. London (Griffith & Farran: 1882, cr. 8vo., pp. xxii. and 289, map.

Very brief notes of the usual trans-continental route to San Francisco, thence south to Los Angeles, across Arizona to New Mexico, and from Sta. Fé *viâ* Kansas City and Chicago through Canada.

Zöller, Hugo.—Der Panama-Kanal. Stuttgart (Spemann): 1882, 8vo., pp. 48, woodcuts. (*Williams & Norgate:* price 2*s.*)

A general account of the Isthmus in the region of the projected canal, apparently from personal observation.

GENERAL.

Bastian, A.—Inselgruppen in Oceanien. Reiseergebnisse und Studien. Berlin (Dümmler's Verlagsbuchhandlung): 1882, 8vo., pp. xxii. and 282, plates. (*Williams & Norgate:* price 7*s.* 6*d.*)

The author discusses (from an ethnographical point of view) Tahiti and neighbouring isles, Tonga, Samoa, Fiji, with Melanesia and Micronesia, Australia, New Zealand, and Hawaii. The store of material contained in this closely printed volume is practically rendered useless from the want of an Index.

Catalogue of the York Gate Geographical and Colonial Library.—London (Murray): 1882, 8vo., pp. iii. and 134. Price 10*s.* 6*d.*

At first printed only for private circulation, this catalogue of geographical books and papers in the library of Mr. S. W. Silver has now been published, in deference to the opinion that its contents and arrangement could scarcely fail to be of use to students in general for referential purposes. Mr. Silver, in the preface, acknowledges the assistance of Mr. E. A. Petherick, whose acquaintance with the literature of the British Colonies (the primary object of the Catalogue) is perhaps unrivalled; and it is by this gentleman that the two valuable Indices have been compiled, one of countries and subjects, the other of authors' names. The Catalogue itself is divided into two sections, one General, the other Colonial: these are again divided by subjects, and the separate entries arranged in order of date of publication. A remarkably useful feature in this catalogue is that it gives separately the contents of miscellaneous collections, such as the Voyages of Hakluyt, Purchas, Churchill, Burney, &c., our 'Journals' and 'Proceedings,' &c.

Hélène, Maxime.—Les Travaux Publics au XIX^e^ Siècle. Les Nouvelles Routes du Globe. Canaux isthmiques et Routes Souterraines. Paris (Masson): [n. d.] large 8vo., pp. viii. and 318, maps, plans, and illustrations. [No Index.] (*Dulau:* price 8*s.*)

This volume (which forms part of the "Bibliothèque de la Nature," published under the direction of Gaston Tissandier) is accompanied by a letter from M. F. de Lesseps, and discusses ancient and modern routes (actual and projected) generally, and the sea canals of Suez, Panama, Corinth, Malacca, Amsterdam, and Gabès in detail; subterranean roads in general, and the tunnels of St. Gothard, Arlberg, Mont Cenis, and Pas-de-Calais in particular, concluding with observations on the great Alpine passes, electric cables, &c.

Lock, Alfred G.—Gold: its Occurrence and Extraction. Embracing the geographical and geological distribution and the mineralogical characters of gold-bearing rocks. . . , a Bibliography of the subject, &c. London (E. & F. N. Spon): 1882, large 8vo., pp. xxi. and 1229, maps, illustrations. Price 2*l.* 12*s.* 6*d.*

The author has devoted 745 pages to the geographical aspects of his subject, discussing separately the topography, &c., of the localities in Africa (3 subdivisions), North America (9), South America (14), Asia (24), Australasia (10), and Europe (14), in which gold is known to occur. These localities are shown on six double-page maps, and thirteen smaller sketch-maps of gold-fields in various parts of the world are also given among the technical illustrations. The Bibliography of books and maps occupies pp. 1153–1185, and the Index is subdivided under geographical and general headings.

Lundgren, W. T.—Hamn-Lexikon. Stockholm (Skoglund): [n. d.] 8vo., pp. xxxviii. and 625.

Mr. W. T. Lundgren, (unpaid) British Vice-Consul at Strömstad, has forwarded to the Society (through Sir Horace Rumbold) a copy of this Harbour Dictionary, which he trusts will be found of utility to the commercial and nautical population of Great Britain. The title, preface, explanations of abbreviations, and names of places, are given in Swedish, German, French, and English, so that the body of the work is easily intelligible, the positions being from Greenwich. It consists of over 13,600 names of harbours, alphabetically arranged, with their situations, and followed by a columnar arrangement of figures and symbols showing (where known) the depth of water at spring- and neap-tides, its general character and that of its entrance, harbour dues, pilotage, towage, and other charges, capabilities for supply and repairs, import and export, latitude and longitude.

Schneider, [Dr.] Paulus.—Die Siedelungen an Meerbusen in ihrer Abhängigkeit von den geographischen Bedingungen. Halle (Niemeyer): 1883, 8vo., pp. 58. (*Williams & Norgate:* price 1*s.* 6*d.*)

A sketch of the physical reasons influencing man in founding settlements in bays.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

Berghaus, Dr. H.—Chart of the World on Mercator's projection, containing the lines of oceanic mail steam communication and overland routes, the international aerial and submarine telegraphs, and the principal tracks of sailing vessels; showing some continental surface characteristics, the oceanic currents, and important deep sea soundings; with 32 additional charts, plans, &c. 10th edition. 8 sheets. Justus Perthes, Gotha. Price 13*s.* (*Dulau.*)

Hémisphères, Carte des ouragans des deux——. Paris, Challamel. Price 1*s.* 6*d.* (*Dulau.*)

EUROPE.

Deutschen Reiches, Karte des——. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1882. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sheets:—145. Stade. 146. Hamburg. 147. Ratzeburg. 149. Schwerin. 180. Hagenow. 213. Perleberg. 214. Wittstock. 440. Gera. 470. Sayda. 494. Wiesenthal. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Diedenhofen, Karte der Umgegend von——. Scale 1 : 25,000 or 2·9 inches to a geographical mile. Königlich. preuss. Landes-Aufnahme 1880, herausgegeben 1882. 4 sheets. Berlin, Schropp. Price 1*s.* 6*d.* (*Dulau.*)

Elsass-Lothringen, Uebersichtskarte von——. Scale 1 : 400,000 or 5·5 geographical miles to an inch. J. L. Algermissen, Metz, 1883. Price 1*s.* (*Dulau.*)

Illkirch-Grafenstaden, Gemeinde-Karte von——. Kreis Erstein (Unter-Elsass). Scale 1 : 5000 or 14·5 inches to a geographical mile. A. Breitel, Strassburg. 4 sheets. Price 6*s.* (*Dulau.*)

Italia, Carta d'——. Scales 1 : 50,000 or 1·4 inches to a geographical mile, and 1 : 25,000 or 2·9 inches to a geographical mile. Istituto Topografico Militare, Firenze. Sheets: 41—II. III. 54—I. II. III. 55—I. II. N.E., N.O., S.E., S.O.; III. N.E., N.O., S.E., S.O. 56—I. N.E., N.O., S.E., S.O.; II. N.E., N.O., S.E., S.O.; III. N.E., N.O., S.E., S.O.; IV. N.E., N.O., S.E., S.O. 73—I. N.E., N.O., S.E., S.O.; II. N.E., N.O., S.E., S.O.; III. N.E., N.O., S.E., S.O.; IV. N.E., N.O., S.E., S.O. 85—I. II. III. IV. 86—I. N.E., N.O., S.E. 97—I. II. N.E., N.O., S.E., S.O.; III. N.E., N.O., S.E., S.O. 111—I. N.E., N.O., S.E., S.O. 112—IV. S.O. 126—I. S.E.; II. N.E., N.O., S.E., S.O.; III. N.E., S.E. 134*bis*.—IV. Price of each sheet 7*d.* (*Dulau.*)

Pressburg, Karte des Komitates——. Nach amtlichen Daten verfasst von A. Schöpflin, k. u. Postinspector. Scale 1 : 144,000 or 2 geographical miles to an inch. Mit color. Verwaltungsbezirksgrenzen und genauester Terrain-Darstellung. Text ungarisch u. deutsch. Price 4*s.* (*Dulau.*)

Ungarn, Statistische Karten von——. Auf Grund der Volkszählungsdaten vom Jahre 1880–1 entworfen und gezeichnet von Ign. Hátsek, Cartografen im k. ung. statist. Landesbureau. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 19. Justus Perthes, Gotha. (*Dulau.*)

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ASIA.

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Russisch-Persischen Grenze, Specialkarte der neuen——, und der Oase Merv. Scale 1 : 850,000 or 11·5 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1882, Tafel 17. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Abessinien, Gerhard Rohlfs' Expedition nach ——, vom Nov. 1880 bis April 1881. Nach Dr. G. Rohlfs' Itinerarskizzen und Höhenbeobachtungen sowie nach Dr. Stecker's Karte des Tana-See's alteren Quellen gezeichnet v. B. Hassenstein. Scale 1:1,300,000 or 17·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 18. Justus Perthes, Gotha. (*Dulau.*)

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——— Skizze des Weges von Deschú nach den See'n des Yukon und zum Oestlichen Kussoóa, im Jahre 1882. Von Dr. A. Krause. Scale 1 : 600,000 or 8·1 geographical miles to an inch. 'Deutsche Geographische Blätter,' Band V. Tafel 5. Geograph. Anst. v. Wagner & Debes, Leipzig. (*Dulau.*)

Brazil.—Die Unterläufe der Flüsse Trombetas, Yamundá, Urubú, Uatumá und Capim. Reducirt nach den 1875 von J. Barbosa Rodrigues aufgenommenen und in 1 : 750,000 herausgegebenen Karten auf den Maasstab 1 : 1,100,000 or 15 geographical miles to an inch. Red. v. Richard Kiepert. Berlin, Dietrich Reimer, 1882. Zeitschr. der Ges. f. Erdk., Bd. xvii. Taf. vii. (*Dulau.*)

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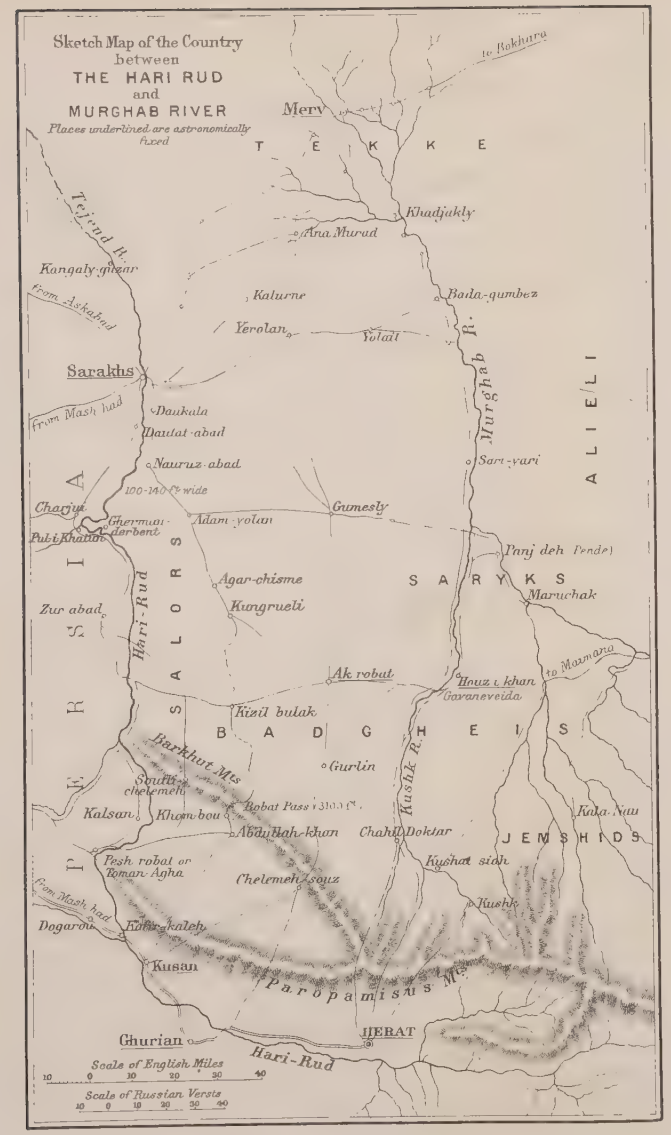
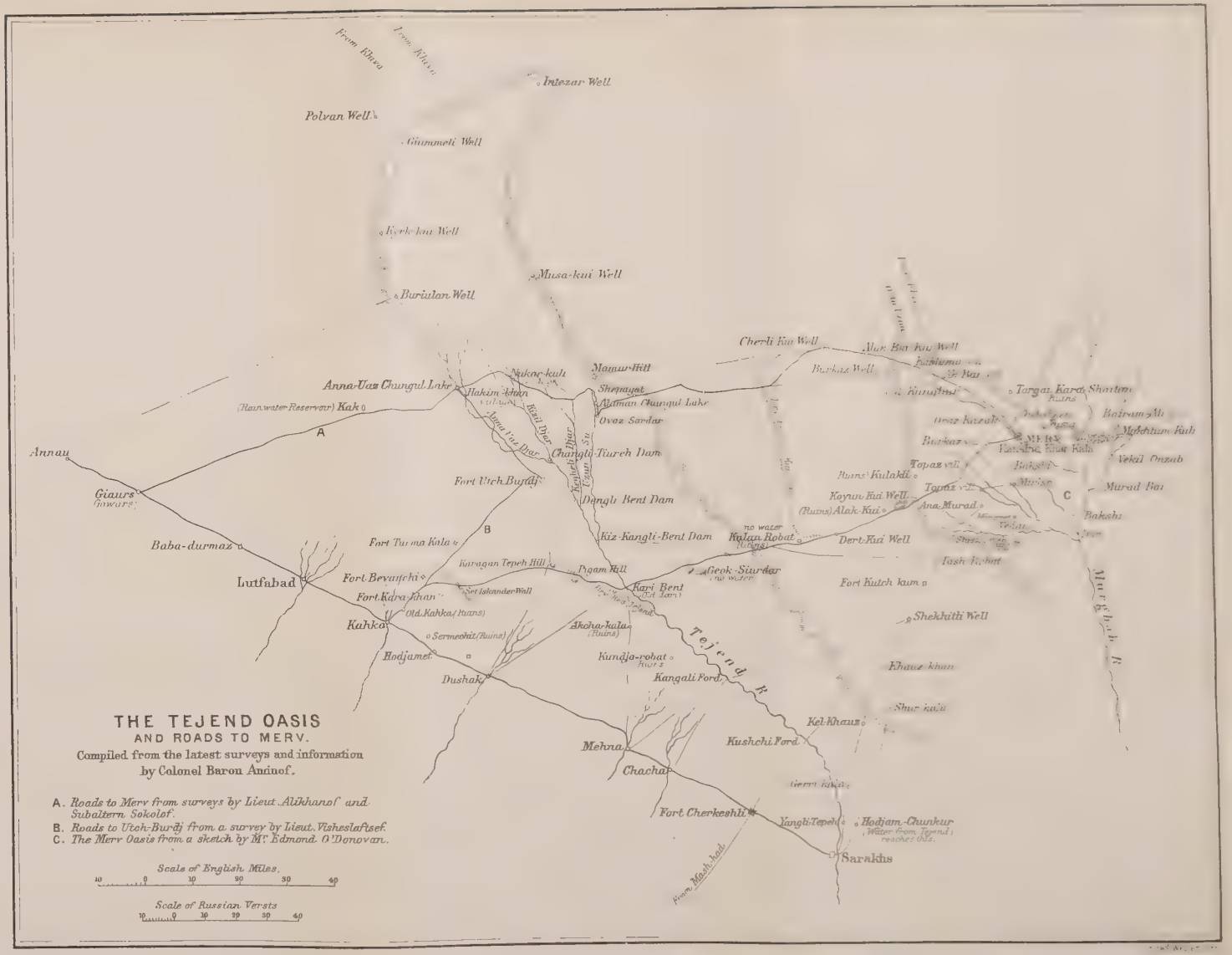
These maps form part of the series of School Wall Maps which is at present being brought out by Dr. Richard Kiepert. They are executed in a bold style, the colours are well chosen, and they are worthy companions of the other maps of this series which have already been issued.





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Itinerary Notes of Route Surveys in Northern Persia, in 1881 *and* 1882.

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(Read at the Evening Meeting, January 29th, 1883.)

Map, p. 120.

[The map which accompanies the following itinerary is reduced from an excellent plane-table survey made by the author on the scale of four miles to an inch. The route from Tehran northwards to Asolat is well known, but new ground is traversed between Asolat and the Lar valley, on the south of Mount Damavand; again between the Harhaz river and Firuskuh, and onward to Kurrand; and also between Fulhad Mahala and Shah Kuh. But while Lieut.-Col. Lovett's survey is especially valuable for its elucidation of untrodden parts of these Elburz Mountains, it also throws new light on the entire route, no part of which had hitherto been delineated with any approach to the same detail and perspicuous accuracy. In the preparation of the reduced map it has been thought useful to add the shores of the Caspian Sea and the courses of the streams which descend into it from the headwaters traced by Lieut.-Col. Lovett. The valleys of the Harhaz and the Tilar are from the surveys made by Major E. D'Arcy Todd in 1836.

It would be a valuable contribution to geographical science if the rest of the Elburz Mountains were surveyed in this manner. It is understood that there are several British officers in the north of Persia who are well able to undertake such surveys, and who would gladly apply their leisure in that way, with the approval of the authorities and a provision for travelling expenses.

Among the unexplored blocks that invite survey the following may be specified :—

1. The mountainous tract between the author's route from Tehran to Asolat, and his route from Asolat to Pul-i-Palar, at the southern base of Mount Damavand.

2. The whole of the range to the westward of the Tehran-Asolat route, up to the Russian frontier.

3. The whole of the mountainous tract between the route from Asolat to Astrabad and the Caspian Sea. This extensive block may be divided into the basins of the Harhaz, Tilar, Tajan, and Nika rivers, coupling with those the small intermediate basins.

4. The interior slopes of the Elburz range on the south of the author's route. This block may be divided thus:—

(*a*) The slopes, including the Lower Jaji, the Habla, and the Nim.

(*b*) The Kuh-i-Karagatch and the Samnan basin.

(*c*) The Damghán and Shahrud basins, including the slopes draining into the Damghán Kavir.]

I. From Tehran to Astrabad.

1. *Gulhek to the Garden of Vujiia.*—This spot—a few trees planted around a tank, on one of the bare sloping spurs of the Shamran mountain—is distant but an hour and a half from Gulhek, and this station formed our *nakl munzil* or sample march. We were sufficiently far to test the efficiency of our equipment, and near enough to enable us readily to rectify any omissions.

Vujiia is close to Osgul, a village where a great number of muleteers dwell. No muleteers were willing to go direct to Astrabad; we were obliged therefore to arrange to take a string of mules part of the way, hoping to get fresh animals either at Firuskuh or elsewhere, or that we should be able to pursuade our muleteers to muster up courage to go as far as Astrabad, and this was what eventually was done. It is curious to remark the repugnance which muleteers from Irak have to travel to Astrabad. They willingly go to Barferosh, a town nearly as far, as unhealthy, and as hot as Astrabad. I can attribute this reluctance only to the traditional bad fame which Astrabad has in regard to climate, and to fear of the Turkomans; the altered state of things as regards the last drawback not having yet been fully realised by the class from which muleteers are drawn.

2. *Vujiia to Ahár.*—Our baggage started at 8 A.M. and proceeded viâ Sonak, a considerable village east of Vujiia, and distant from it about two miles by a road crossing the spur of the Elburz Hills, which forms the watershed defining the southern limits of the Jaji Rúd valley. This road runs at an even gradient. We took a short cut over the hill spur, rising from 5600 to 8600 feet, and thence we descended right on to Hajiabad. From the crest we had a misty view of Damavand and the Jaji Rúd valley, as far as where the river turns to the south into the gorges through which it passes previous to debouching into the plains at Kábúd Gúmbuz. We also perceived Uchan. Arrived at Hajiabad we there waited until the caravan came up, and then following the Jaji Rúd we came to Uchan. The valley is narrower and there is but a meagre strip of cultivation until Uchan, a small village with some fine

walnut and chinar trees, is reached. From that point we turned westerly, following a tributary of the Jaji Rúd in the midst of a very pretty valley, well wooded with walnut and poplar, &c. One spot, called the Bagh-i-Egil, is very umbrageous and green. About two miles further on we passed the village of Egil, situated at the junction of a stream falling into the one we had followed, and 2½ miles more brought us to our destination, Ahár, also situated at the junction of two streams, and surrounded by cornfields and trees. Under the shade of some of these our tents were pitched. The march to-day was easy, and occupied for the baggage eight hours.

3. *Ahár to Sarak.*—We took the road that follows the winding of a stream coming from the west for about two miles, passing through cornfields and other cultivation. Ascending a somewhat steep hill by a zigzag road, we then reached a small plateau, and thence the road took us by a gentle gradient to the water-parting between the Jaji Rúd and the Kirij river basins. 1300 feet above this water-parting, on the top of a very steep hill of slate rock, stands a ruined dome of masonry, called the Kaleh-i-doktar. It was probably some kind of a shrine. The absence of water anywhere near precludes the idea that it was a fortalice, as the muleteers told us it had been. However, as it is 10,500 feet high, and is isolated, it forms a capital survey point. We now descended by a winding road to Shiristanák, passing Gel in the distance, where the Shah has a shooting-box—a mud inclosure with some fairly-sized buildings inside; near it is a waterfall coming from the Tojal summit of the Shamran range. Shiristanák stands at an elevation of about 7400 feet above the sea; it is a largish village, containing perhaps 1200 inhabitants, and there is cultivation all round about it and in the adjacent valleys. We followed the course of the stream, which is about 50 feet wide by two feet deep, until we arrived at Sarak, a small hamlet, where we encamped under the shade of some fine poplars and planes. The hamlet of Sarak is not far from the junction of the stream on which it stands and another flowing from the south. At this junction, at the proper season of the year, viz. late in July, trout are caught. The road we pursued was very fair, in fact for Persia quite good. This was the road laid out and finished about eight years ago by General Gasteger, an Austrian officer in the Persian service. We came upon the road at Shiristanák, and followed it from Sarak to Husun Ikdir.

4. *Sarak to Husun Ikdir.*—It keeps mostly to the left bank of the Gutchisir stream. This stream, called the "Lora," meets the river flowing past Sarak, about 2½ miles below it. The water from Gutchisir is of considerable volume and velocity, perhaps 80 feet across and eight to 12 feet deep, with a velocity of eight to 10 miles an hour, and is very turbid and discoloured. There are, however, numerous rapids and cataracts, otherwise this would be a magnificent means of communication between the capital and the charcoal-producing forests, now 70 to 80 miles

distant by road. We met daily at least 200 mules in strings of from fifteen to four, heavily laden with charcoal from the Kájúr and Díná forests. That, after all, only represents 30 tons of charcoal daily. The sources of charcoal supply are yearly becoming increasingly distant from the capital, and unless the coal-mines beyond Kirij are properly worked the question of supplying Tehran with fuel will after a time become vitally serious. Much might be done in the way of re-wooding favourable sites on the Elburz, readily accessible from Tehran; but it is to be feared that, although for purposes of the royal chase, glens and pastures can be strictly preserved, for such a matter-of-fact business as replanting much difficulty from incredulity and unappreciativeness would be experienced.

At Husun Ikdir we crossed the river by a bridge of poles thrown across. The village has a shrine, lately renewed. It is also small and dirty, but we employed a day's halt in ascending a grand mountain called the Kuh Kachang. The main summit, 12,200 feet high, was ascended by Mr. Arthur Larcom. From its summit Damavand can be seen, and from a lower point—11,500 feet—I also obtained points all round. The whole aspect of the landscape is, however, as hideous and disappointing as scenery in Afghanistan. Ridge after ridge of bare hill, and curtain behind curtain of serrated mountain, certainly sometimes of charming greys and blues, but still all bare and naked, rugged and arid.

5. *Husun Ikdir to Gutchisir and Waliabad.*—We followed Gasteger's road, passing through considerable strips of garden and cultivation, and crossing the valley in which is situated the village of Nísá. The Lórá river, four miles further, turns to the east at Gutchisir, a small village, and the last spot where any trees grow until Waliabad is reached. Its course above this point is probably of some length, and requires investigation. From Gutchisir the road follows a stream trending westerly until the foot of the Kotal-i-Gutchisir, an ascent 1600 feet high, is reached. Here the road rises by easy gradients to 10,200 feet. The view from the top is grand: the whole of the Shamran range, the Azadbúr range, and Damavand, and the striking-looking peak of Shahzád is visible. Just beyond the water-parting there is a spring of sulphurous water. Proceeding onwards a few miles, vegetation recommences—a few stunted dates and other trees; the atmosphere also becomes much less dry, and by the time Waliabad is reached one feels in quite a different climate: white vapoury clouds come sailing up the Chálás valley, bearing along with them a savour of the sea. The road as far as Waliabad is very fairly engineered.

6. *Waliabad to Towar.*—The road still follows the course of the Chálás, now many hundred feet down in the valley below. It is steep and very winding, and before the fencing recently put up was erected, must have been dangerous for animals passing each other. A tunnel about

30 yards long, with a ridiculous effigy of the Shah cut out of the rock, and a Persian inscription commemorative of the completion of the work, provokes the contemptuous smile of the passing traveller. The whole road might have been laid out from the point above Waliabad (where the river is crossed by a bridge) at a much lower level, whereas the steepness of the road in part nullifies what would otherwise have been a work of considerable utility. As lower levels are reached, forest trees and general verdure refresh the eye; and when the level of the river at 3400 feet is reached, the gurgling water, strips of sward, and tall forest trees, backed by the green hills, quite make one doubt being in Persia at all, so unlike is the scene to its usual ugly monotony. Towar is a small village situated about 800 feet above the river; it has some cultivation about it, and we obtained all the supplies we required.

The next day we shifted camp to a grove of hornbeam (?) trees, called Asolat, situated in the bed of the Chálás. The place is a large and rather miry meadow, 1700 feet above the sea, and the shade afforded by the grotesque and fantastic growth of the huge hornbeams makes it a suitable camping-place. On our way we passed Rázán, crossing the Chálás by a bridge there. Murzanabad was opposite, about three miles distant. Supplies were got from thence.

7. *From Asolat to Arsinkírú.*—This was the prettiest march we made. On leaving the Chálás valley we soon plunged into regular forest, with clearings here and there. The general elevation was about 4000 to 4500 feet. The forest scenery was very English-looking—fine oaks and much greensward. After emerging from the forest, we descended and crossed at 3000 feet the stream that flows from Firosabad. This is said to be a ruined village, lying at the foot of the Kuh-i-Pálár. The country in that direction, except just the head of Pálár itself, seemed covered with dense forests. We then came to the village of Dásht-i-Nazir, a well-to-do village apparently. The inhabitants were busy getting in their harvest. We had remarked that, with the exception of Waliabad, the villagers we had seen seemed prosperous, had good clothes on, and were fat and healthy looking. Probably the Persian peasant's lot is, unless under an exceptionally hard ruler, rather better than the life of toil and poverty led by many Irish, German, and Russian peasants. From Dásht-i-Nazir we marched along the Puhl river till we reached a junction of two streams near Arsinkírú; here we encamped, obtaining supplies at the latter place. Two roads now were optional, one viâ Kájúr, lying east of us, and the other viâ Mekhsás, lying south. We decided on the latter, owing to the exigencies of the survey. We therefore marched

8. *From Arsinkírú to Mekhsás.*—We diverged slightly from our route in order to visit Puhl, a populous village on the road to Kájúr. Then, crossing a wide plain where harvesting was in progress, and which was teeming with quail, we crossed a ridge of limestone, and descended into

the Lergan valley, and thence went on to Mekhsás, where we encamped. The valleys are here wide and well cultivated; the huge mountains to the south afford copious supplies for numerous streams by which the valleys are irrigated.

9. *Mekhsás to Oz.*—The ascent over the pass, 10,000 feet high, from 5500 feet at Mekhsás, took about three hours for the baggage, the road being pretty fair. From the top of the Mekhsás hill a view is obtained of the Núr valley, Damavand, and the Shahzád Kuh. The view to the south is of the usual arid character of these mountains: to the north the country is more fertile, the hill-sides are clad with trees, though not with dense forest. The Núr valley might be a valley in the highlands near Ispahan or Shiraz as far as the appearance of the hills inclosing the valley and the look of the villages are concerned. Oz has considerable cultivation, and has probably about 500 inhabitants. This village, like all the villages of the Elburz, possesses a shrine or Imamzadeh. The resting-place of the holy man is generally denoted by a tower of masonry, whitewashed, with a conical roof; this roof is sometimes covered with tin-plate, which when new shines brightly in the sun. The general appearance of these shrines is clumsy and ungraceful, differing in this respect from those of Irak.

10. *Oz to Báládeh.*—We followed the course of the Núr river for about 15 miles, the road at times being exceedingly bad. There was a continuous breadth of cultivation from Oz to Báládeh, although the villages are few in number. We passed Yúsh, the most considerable; it was seemingly deserted, every one of the inhabitants being out in the fields harvesting. The valley was narrow, and the cliffs on each side high and steep. Good views, therefore, of the higher hills north or south were not obtainable, so the survey was confined merely to the valley immediately adjacent to the Núr river.

Near Yúsh, some substance resembling coal was found in the strata of a cutting by the roadside, but it did not support any tests. Coal is said to exist near Gutchisir, and some of it used to be carried to Tehran. After passing the hamlet of Ursúsí we debouched into a valley about two miles wide by four miles long, formed by the junction of a river from the south. This river flows from the northern spurs of Damavand past Yálú. It also receives as tributaries streams from the hills lying between Damavand and the Shahzád Kuh. The Núr river thus becomes a stream of considerable importance.

Báládeh is a large village with 1000 to 1200 inhabitants. There are several fine gardens, with some huge poplars. The houses are of better style than usual for villages. To the east of the village rises a wall of rock through a gorge in which the Núr dashes past, a narrow but deep and rapid stream.

11. *Báládeh to Chashmeh Shahi.*—This was a long march. We left Báládeh by 8 A.M. and reached camp at 8 P.M. The road lay along the

bank of the Yálú river. We passed Kálwek, about five miles from Báládeh, and learnt that there were two villages on the stream to the right named Kamaru and Bordu. The river valley was hemmed in by bare hills, mostly of conglomerate. At four miles more we passed the village of Mireh, containing perhaps fifty houses, situated 7600 feet above the sea. From this village, looking up the valley south-east, two high snow-covered peaks are observable about 15 miles off. Following the valley through varying widths of cornfields, we got to Yálú, a village of about 150 houses, and apparently a thriving place and house-of-call for muleteers. We met many strings of unladen mules going to Báládeh; from thence they go on towards Kájúr to the forests for charcoal. Twenty francs per season is paid for the privilege of charcoal-burning, and the renters can then help themselves to the trees as they like or where they like. This license is of course productive of great waste and wanton destruction, and there is no regulation to assist the recuperative action of nature—no fencing to prevent flocks and herds from grazing on the young shoots. The consequence is that the forest is being curtailed yearly.

From Yálú the road ascends through a narrow gorge in the mountains by a very steep and badly-designed road, where the Shah has had some miserable bridges made. The pass is about four miles long, and the road, good in some strips, rises from 7900 feet to 9200 feet. Here are presented all the characteristics of Persian highland scenery—hills covered with heath, and stunted acacias that look like huge hedgehogs, with sparse tufts of grass between them. The air is however very pure and fresh, and the water of the stream icy cold. We then reached an encampment of Iliyats at the place called Kuchikek; proceeding south and still gradually ascending, we passed through an opening in a wall of rock about 20 feet broad—the dyke of basalt in which this opening occurs rising 80 feet or 90 feet on each hand, and presenting all the appearance of a gigantic gateway. This is called the Palang Durwaz, or the "Panther's Portal," and may be the famed Caspian gates, about the situation of which travellers and antiquarians are so uncertain. Leaving the Panther's Portal at 4.25 we reached at 5.30 the water-parting, 11,100 feet high, where sheets of snow were still lying in the shady hollows of the hills (July 5th). We ascended to a suitable peak (11,400 feet) for observations, and obtained sights of Damavand which towered a further 8000 feet above us, and also of the more distant Tojal Peak of Shamran. We then descended, and got to our camp at the Chashmeh Shahi by dark.

12. *Chashmeh Shahi to Khan Lar Khan.*—In order to take up the thread of the survey, we had next day to retrace our steps for about three miles. The whole of the valleys watered by the Lar river (which is called the Harhaz), after passing the Pálár bridge, bear evidences of having been the bottom of a large lake. The fall of the river is slight as

far as Dálíchai, being from 8900 feet to 8500 feet in a length of 26 miles, or at a fall of 15 feet per mile, and the valleys themselves have wide flat plains not easily accounted for except under the supposition that they have been deposited under water. I think an examination of the gorge just beyond Dálíchai explains the cause of these lacustrine bottoms. Before Dálíchai, although within a distance of six miles from the crater of Damavand, the rock formation evinces no volcanic origin; but about one mile more to the east we come upon masses of lava brought down by the winter glaciers and moraines, and further on the rock is lava; and the gorge cut by the Lar in its descent from 8500 feet to Puli-Pálár (7000 feet), or 1500 feet in four miles, is formed on the one side by the nummulitic rock forming the southern bank, and on the other side by the lava that has flowed down from the Damavand. The conclusion seems to be this: the overflow of eruptions when Damavand was an active volcano seems to have flowed south and south-east, and not to the south-west. Regarding the northern slopes I cannot speak, not having visited them. Now the fluid lava overflowing south came into contact with the nummulitic range running east and west, and effectually dammed up the Lar, causing all the matter it brought down to be deposited, and in the course of ages to form the wide flat elevated plains that now form the Lar pastures. Since the extinction of Damavand's activity, at all events on the southern side, the accumulated waters have found out the weakest point in the lava wall and have made for themselves a channel or cañon along which the Lar now rushes on to Pul-i-Pálár. The Lar plains are so well known, and have probably been so often described, that it is unnecessary to say anything more about them here. We found the Royal Camp was established at Siah Pálás, and therefore proceeded to the pasture called Khan Lar Khan where we camped by the river.

13. *Khan Lar Khan to Ask.*—Next day we followed the course of the Lar, passing the Safid Rud that flows into it, and encamped on a spur overlooking the Dálíchai river. We passed large herds of brood mares, who roam almost at will over these wide plains and gentle uplands. Supplies are not generally procurable, and there are no villages nearer than Ask.

Saturday, 9th July.—Leaving camp at noon we got to Ask by 5 P.M.; distance three and a half farsakhs. The track from Dálíchai or Safidab lies on the left bank of the Harhaz for about two miles. The road then diverges, one going to Pul-i-Pálár, and the other, a mere track on the left hand, eventually joining the high road from Damavand to Amol. About one mile from the Safidab river the ground is found covered with fragments of lava, some of considerable size. They are apparently all ice-borne, and the cold in winter is described as being intense. Last year (1880–1) the high road to Amol, at the point where it crosses the higher spurs of Damavand, was closed for twenty-seven days. The Harhaz river flows

through a narrow chasm, gradually increasing in depth until its steep sides rise south of the cone of Damavand to between 1200 to 1500 feet. The road, newly made towards Amol, has a breadth of about 16 feet. The section is, for the portion I saw, fairly made, but like all Persian hill roads it requires an inner drain. The revetment walls are poor, still it is an immense improvement on mountain tracks in this country. The gradients also are prohibitive for cart traffic. A large sum of money must have been spent on this work, as the side cuttings, through lava rock, exhibit a considerable amount of work. The highest point of the road was 9000 feet above sea-level, and pasture lands could be discerned extending up the flanks of the great mountain, to heights probably of 14,000 or 15,000 feet. The village of Rehna (described by Major Napier), is visible from some distance, possessing, as usual all over the Central Elburz, a conical-shaped and white-washed Imamzadeh surrounded by a few trees. From 7500 feet the road drops down in a length of two and a half or three miles to 6300 feet. It zigzags for some distance, and then goes on towards Rehna. A path steep and bad winds down into a ravine, at the bottom of which is a sulphur-impregnated stream that eventually falls into the Harhaz. Crossing this stream and keeping along the left bank of the Harhaz at a dizzy height above its surface, we pass through fields, gardens, and orchards, and gradually descending reach Ask. This village is almost deserted in winter, although it can boast of having a Governor. The inhabitants mostly come from Mazanderan, that is, from Amol, for the summer. The houses have flat roofs, are built of sun-dried brick, or mud, and look quite like any other village in Irak. The streets are very narrow, and the only path is along the deep and dirty gutter in the middle of the street. The pervading stench of sulphuretted hydrogen is at first insupportable. The sulphur baths at this place are much resorted to by patients suffering from rheumatism. There is no decent ground to encamp; travellers had better avoid Ask and encamp near Rehna or at Ira, about three miles further on and across the river. A single-arched bridge of about 22 feet span has lately been thrown across the Haras. The centering had not been taken down when I passed. Supplies—such as fowls, eggs, barley, fodder—procurable, but no fruit.

14. *Ask to Lesan.*—Starting at 5.20, we reached camp at 10.30 A.M. The first hour was expended in climbing up by a very steep path the cliffs overhanging the Harhaz, on its right bank. On the top of this cliff the ground is to some extent flat and well cultivated; corn was nearly ripe. In the midst of these fields stands the considerable village of Ira, containing perhaps 200 houses. The peasantry seemed well-to-do; their clothes were new and clean, the houses in fair order, and there was much outward evidence of prosperity. A guide was not procurable under five krans, thus showing considerable immunity from want. The services of a local guide were consequently, on this exorbitant price being asked for,

dispensed with. From Ira the road ascends till it reaches an elevation of about 9200 feet. There is water at intervals issuing from springs. To the left of the pass a peak called Kuh-i-Surd rises to the height of 10,600 feet; from there the view of Damavand is magnificent, and much more picturesque than from the west. In an adjacent valley to the north lies the large village of Nóváh, surrounded by fruit and willow trees and cultivation. A track passes through it and on to Arjumand. During the ascent, until nearly reaching the top of the pass, we had been surrounded by mist and white clouds. The view that met our gaze from the top of the Kuh-i-Surd was beautiful, Damavand and other peaks around rising out of a sea of white vapour, which roughly indicated the course of the Harhaz. The clouds gradually disappeared as the sun heated the atmosphere; but they are generally present at night between the levels of 4000 to 6000 feet. Below the 4000 feet contour the heat of the atmosphere prevents condensation, and above 6000 feet the evaporation of the Caspian is not carried up inland, except occasionally when pushed by the wind. Lesan is a village of perhaps 150 houses. Ordinary supplies are procurable. There is no suitable camping-ground near Lesan, but several spots adapted for a tent or two are situated at about three and a half miles off, by the bank of the rivulet that flows westerly into the Harhaz.

15. *Lesan to Arjumand.*—Started at 5.15 and proceeded eastwards up the valley varying in breadth from half a mile to a mile. The cornfields very promising, and some ready for the sickle. At 5.45 we passed the valley of Engamor, lying on the right-hand side, from which a stream flows. The Shah has visited this valley, which is said to be "nihiat khúb o khúsh o kuram," that is, there is probably a little spot of green turf, a good spring of water, and a few trees for shade, where breakfast can be enjoyed. That seems the ideal standard of beauty or fitness in a landscape from the Persian point of view.

Going still eastwards and gradually ascending by a road practicable for field-guns, we reached the water-parting, 9750 feet high, at 6.45, the hills forming the head of the valley gradually closing in. Ascending one which dominates the valley, we obtained, at 10,600 feet, a view of Damavand to the north-west, and 40 miles east a conspicuous peak, about 11,800 feet high, called, as I subsequently ascertained, Kadamgáh, as yet unmarked in published maps. Starting again at 8.15, we passed a series of villages till we reached camp near Arjumand at 4 P.M. These villages are situated on the banks of a torrent, locally the Nimrúd, that increasingly augmenting its volume by the contributions of tributary streams, eventually under the name of the Dálíchai, flows out into the lower plains about Lashgird, called Khavúr (see Napier). The strip of land cultivated on each side is not broad. The villages are, however, some of them large and apparently well-to-do. The names are the following: Zirmand, Nujufdurd, Dehan, Asu, and Underia. Asu is the

most considerable, and is a better halting-place than Arjumand. The latter is situated one and a half mile to the left of the road to Firuskuh, up a side valley traversed by the stream that flows with a considerable body of water into the Nimrúd. It is a village surrounded by high bare-looking hills, and is built on a small eminence that gives it a compact and symmetrical appearance. Our march from the water-parting was in the district of Kúsgăuchă.

16. *Arjumand to Firuskuh.*—Starting at 6 A.M., we reached camp at Firuskuh at 1.30 P.M.; our course being along the banks of the Nimrúd, till we reached the village of Siliván. The breadth of cultivation was wider, and to the south the slopes of the hills were in many places cultivated, but the only village visible was Wástang. The crest of the chain on the right hand recedes to the south and diminishes also in altitude. Siliván is a small village on the banks of the Nimrúd, where it trends abruptly south; beyond it is the escarp, 400 feet high, of the Firuskuh plateau. This plateau in general appearance resembles any of the highland pasturages common in the table-lands of Irak. It is sparsely covered with stunted vegetation of strong-scented scrub-heather, &c. It is said to be strictly preserved for the royal chase, but although for the purposes of survey I was frequently at some distance from the main track, and on hill tops and so on, I only saw one gazelle. Viewed from a height, this extensive plateau is found to be deeply furrowed with numerous ravines, flowing from the hills forming its northern watershed into the Nimrúd. Probably at one time the rainfall over this valley was much greater than at present. During my halt at Firuskuh I observed the rain and moisture-bearing clouds from the Caspian came and rested on the mountains, endeavouring to advance into the plain by every valley looking into it, but beyond a certain distance they could not go; the higher temperature of the air over the plain dissipated the clouds into invisible vapour.

Under another government, doubtless, measures would be taken to replant these native plains, gradually reforesting them, beginning with the southern slopes of the hills, and thus coaxing the rain to fall. Such measures, besides ameliorating the climate, would lay the foundations of future stores of fuel, and they would have the further advantage of gradually increasing the output of water for irrigation purposes on to the parched plains farther south. But the hand of the charcoal-burner is playing havoc with the southern edges of the forests of the Tabaristan, causing them to shrink yearly in extent, and on the north the ill-regulated felling of boxwood, walnut, and other forest trees is curtailing the extent of their northern margins. It is, however, obviously useless to expect that the Persian government will abandon its neglectful course as regards the abundant natural resources of Iran.

The village, or town of Firuskuh, as it may be entitled to be called, being dignified by a local governor, has been already described by Major

Napier. There is a telegraph office here where I proposed putting up, but found it occupied. A line going from this town to Semnan was put up for the Shah; there is no traffic. The local telegraphist, a Shirazi, called on me the second day of my halt to see me; he complained of the stinginess of the inhabitants, and said that, although well off, they never indulged in mutton, always eating goat-meat because it was cheaper! I found also that nothing was procurable in the bazaar, not even candles or fruit, only ordinary provisions, barley, fowls, &c.; even a shoeing-smith was not available. Whilst on this subject it may not be uninteresting to notice the *modus operandi* of shoeing horses in Persia. The shoes used are similar to those employed in Afghanistan. The shoeing-smith merely puts them on, he does not forge them, that is another man's *specialité;* consequently no alteration can well be effected, and generally shoes are put on that bear no relation to the shape or size of the hoof. With Persians, as with Indians and Afghans, the hoof has to be trimmed according to the shoe. This is accomplished by a large flat gouge fitted to a handle on one side; the shoeing-smith pares away the hoof by drawing this parer or gouge over the hoof towards himself. In the Caucasus a smaller parer is used, only it is pushed from the operator, not pulled towards him. The hoof being pared to the satisfaction of the *nalband*, he selects a shoe and nails it on with six or eight nails; to clinch these the animal is made to stand on the foot which is being operated on, resting on a block of wood, and the portion of the hoof projecting beyond the shoe is ruthlessly pared away and rasped off; sometimes as much as an inch in height of the wall of the hoof is thus cut away.

Finding no accommodation inside the town I had my camp pitched near a stream that falls into the Gorsafid river. There is no eligible site for a camp, and the strong wind blowing day and night from the north was very disagreeable. This wind carried some clouds from the northern mountain range partially across the plain, but no rain fell. At Firuskuh, a *chapur khanah*, or posting-house establishment exists. The chapur khanah is in ruins, and three sorry nags are kept out in the pastures for occasional posting.

17. *Firuskuh to Chashmeh Kabúd.*—As Major Napier had taken the road to Fulhad Mahala viâ Gorsafid, I adopted a different route, and started at 7.20 A.M., reaching the water-parting to the north-east at 10.12 A.M., at a ruined serai, called the Kuduk-i-Sháh Abbasi, as it is believed this ruined serai was one of the numerous ones erected by Persia's great monarch of modern times. The route lay over a gradually ascending plain, until from 6700 feet at Firuskuh we rose to 7800 feet at the water-parting. This route is much frequented by carriers taking charcoal and planks of beech and walnut to the capital. Their route from the water-parting goes downward into the valley of the Tilar, and thus into the forests of Mazanderan. We took a hilly path to the right,

gradually ascending the hills that lay to the east, passing several hamlets inhabited by Mazanderanis, who with their herds of mares, come up here in the summer months. The difference of dress and manners from the peasantry we had hitherto seen was marked; the men wearing huge sheepskin hats and short jacket-like coats, baggy breeches, and leggings of webbing bound round and round. These they call *pai-tu*, a corruption of *pai-tua*, or leg wraps. Possibly the same articles called in Kashmir *putú*, and known over Northern India by that name, have their derivation from the Persian *pai-tua*. The women also appeared unveiled; they wore red shirts and blue trousers, and looked excessively dirty. Chashmeh Kabúd is a very small hamlet with a good spring of water; no supplies, except milk and grass, procurable, and no proper camping-ground. The path from the water-parting is not practicable for any except lightly-laden animals. The hills were still bare, though to the north there were glimpses of forest-clothed peaks and slopes. A few wild gooseberry bushes grew about Chashmeh Kabúd; this fruit is called *gúlshaugir*. This plant is not commonly found on these hills.

18. *Kabúd Chashmeh to Sálásh.*—A short but difficult march over the hills to the east. Sálásh is a *chaman* or pasture of a few acres in extent, visited annually by the shepherds of the Sung-i-sin tribe, who inhabit during the cold season the large village of the same name close to Semnan. They live in black woollen tents, and are engaged in pasturing their numerous flocks of sheep and goats and in converting the milk into cheese and butter for sale. This tribe is numerous, and they occupy all available pasturage from Semnan to the neighbourhood of Khing. After pitching camp, I ascended the Kuh Kadamgah, distant about a mile to the north, reaching the top in about three hours and obtaining a view of Damavand. I observed the configuration of the country towards the Caspian; but unfortunately in that direction there were clouds. Supplies had to be brought with us, nothing but milk or cheese being procurable. There are at Sálásh, elevation 8600 feet, small patches of barley now being harvested, and consequently all hands are thus engaged; a guide was, therefore, not available except at an outrageously high price.

19. *Sálásh to Chashmeh.*—About 25 miles. Started at 5.30 A.M. and proceeded eastwards along a narrow valley sparsely cultivated here and there at encampments of the Sung-i-sin shepherds; the vegetation, of yew or juniper, or cypress, gradually increasing as we proceeded. After going on for eight or nine miles along a tolerably decent track, we arrived at a gorge called the Tung Rosiá, the path along which was very bad, and in parts dangerous. The scenery, however, was wild and picturesque in the extreme. We passed a splendid spring called Chashmeh Rosiá; the water pours out from three heads in large volumes, so that the stream which above the springs was only about eight or nine inches deep, was, below them, about two feet deep and 12 feet wide. The

water comes out of a crevice in a precipice of rock, and is said to be perennial in its flow.

We then ascended from the stream that trended away to the left eventually to fall into the river that flows on the north side of the Kadamgah Mount and thence to the sea, under the name of the Rud-i-Tilar, and passing over an eminence, saw the large village of Chashmeh in the distance, lying at the foot of the Nizwá mountain. About five miles more marching brought us to camp there about noon. The village is mostly inhabited by Syuds, and has a considerable breadth of cultivation. A stream coming from the Nizwá mountain (not Nezwar as in the maps), divides the village into two portions; both seem neglected and not very well-to-do. There is a shrine, shaded by venerable walnut-trees, that forms a conspicuous object, discernible from a long distance. A mountain path leads from Chashmeh into Mazanderan over the hills to the north; it is said to be practicable for laden mules. The Nizwá mountain is very lofty, 13,500 feet is mentioned on the map, and is said to abound in game and to be accessible to the very summit on horseback. I was unable, however, to go to the top, and as the weather was misty it would not have been worth while had it been practicable. I was told that twenty years ago the Turkomans used to penetrate as far as this valley and capture any unfortunates they could lay their hands upon.

20. *Chashmeh to Kurrand.*—Left at 5.20, and proceeded over some low hills south-easterly, until we got to the bed of the Kúría river. This valley has a breadth of cultivation from a quarter to half-a-mile in width, and trends westerly, rising from 7400 to 8000 feet in eight miles. At this point, where we attained the Kúría, another stream, coming from the Aneseran pastures that extend up to the high ridge separating them from the Shahmirzad district, fell into the Kúría; and a short distance lower down the stream that drains the Jash valley falls into it. Leaving then the uplands of Aneseran on our right, we got, after three hours' marching, to the spur running down from the Nizwá mountain, dividing the Kúría-Tilar basin from the streams flowing into the Damghán deserts. This spur was of gypsum and clays. The ascent was easy, and by 9.30 we had reached the water-parting, having an elevation of 9300 feet. From here Damavand was visible. This table-land is only a few square miles in extent, spreading out eastwards, and is called the Khing plateau. It is frequented by the Sung-i-sin tribe, is well watered, and the quality of the pasturage is good. The map, as already pointed out, is incorrect in representing this plateau as being about 200 square miles in extent; it is certainly not more than 16 to 20 miles, being bounded to the south by hills shutting it in, and separating it from the Shahmirzad district, a district unnoticed in the map; and by a bend to the north from the lower plains stretching away as a wilderness of rugged aridity towards Ahúan. I had now come upon Major Napier's

track, and followed it as far as Fulhad Mahala; there being no practicable outlet to the north into a valley lying in the direction of my destination, at least such was my information in the absence of a properly qualified guide. Major Napier's description being minute and accurate, it will be unnecessary for me to do more than briefly chronicle the march as far as Fulhad Mahala. Leaving the Khing plateau we went on, after crossing two deep valleys with streams flowing from the Nizwá towards Damghán, to the Kurrand pasture. Here the shepherds were busy hay-making and carrying the crop away to their winter-quarters in Mazanderan at "Pelver," not very far distant from this their *yelak* or summer quarters. Sheep, milk, eggs, fowls, fuel, &c., were obtainable, but barley not readily.

21. *Kurrand to Fulhad Mahala.*—It was a cloudy misty day with a keen north wind, so that although mid-July I was glad to wear my cloak. We left the comparatively open ground in the neighbourhood of Kurrand, and proceeded up the Huskuh valley, and then along a narrow valley hemmed in on either side by high hills, those to the south having easy slopes covered with juniper shrubs, and those to the north presenting a wall of bare rock for several miles until the valley becomes more open and wider; it is then called "Resum-Rudbar." The road to Fulhad Mahala leaves the valley six miles after passing the Pelver gorge, and crossing over the northern boundary and stretching along two pastures, attains the spurs of the hills overhanging Fulhad Mahala, at about 1500 feet above the plain. Along the route, at distances of four to five miles, were black tent encampments of Mazanderanis, and also of gipsy blacksmiths and sieve-makers, called "Tola." Each encampment had its patch of barley or wheat, and the men were busy harvesting. At 2 P.M., we got to Fulhad Mahala, having marched for nine hours.

Fulhad Mahala stands in the midst of a wide extent of cultivation, irrigated by a karez. It is a considerable village with perhaps 500 inhabitants. The village stands on a slight eminence and is circular in shape, the houses with flat roofs and mud walls clustering round the central hillock on which can be discerned the remains of an ancient keep. Around the village are some walled inclosures; and a garden with tall poplars, called the Bagh-i-Sirtip, after its owner, the Sirtip Ibrahim Khan, the present Governor of Hazar Jarih, is situated to the south-west of the village. There were no outlying villages visible, and the hills all around were bare of trees except just one bluff in the north-west, where apparently the edge of the great forests of Tabaristan was visible. The Shah Kuh is a conspicuous object from Fulhad Mahala.

From Fulhad Mahala the direct route to Chardeh is along the valley asterly, viâ Chashmeh-Ali; an alternative route is viâ the parallel valley of Sir-i-Tang; this route being apparently unknown to geographers, was the one I adopted.

22. *Fulhad Mahala to Pishirt.*—Took us nine hours' marching. Two

hours after leaving Fulhad Mahala we reached the water-parting lying to the north, after gradually ascending from 6500 to 7200 feet. Beyond the water-parting the ground rises again, but the road following the course of a stream threads its way through a gorge called the Tang-i-Chapúr. The view of the valley of Sir-i-Tang from the heights overhanging the gorge is very pleasing. The valley is more wooded than those we had lately been traversing; several villages with surrounding gardens dotted the face of the country (viz. Vulna, Tilma, Kirat). The drainage of the valley finds its way out by a gorge through its northern boundary called the Tang-i-Shoráb. The drainage from the eastern end abounds in mineral springs, especially at Súrt, where sulphurous sources exist, resorted to by rheumatic patients.

On the way to Pishirt, a village situated opposite the gorge above mentioned, we crossed several ravines covered with thick underwood of wild pomegranate and other shrubs, abounding in red-legged partridges. Pishirt is a small village in a large and shady grove of walnut-trees, with a spring close by. This grove is suitable for a small camp, and reminds one of the great mango groves of India.

23. *Pishirt to Chaman-i-Manga.*—The road leading out of the Sir-i-Tang valley keeps alongside and in and out of the course of the main stream flowing from north-east to south-west. The hills on each side are from 300 to 400 feet high, and are separated by streams running down from those on the south. These hills are studded with stunted juniper shrubs. On one of them is the village of Kaleh-i-Sir, or Kaleh-hizar, containing at least 80 houses or about 250 to 500 inhabitants. There was a good deal of cultivation about, every favourable spot being under plough. We passed the sulphurous springs before mentioned, near the village of Súrt. The hills, or cliffs rather, are of gypsum and marl, and this formation continues until, as we gradually approach the water-parting, the hills on either side diminish in altitude. We passed some gipsy encampments, where the people were occupied mostly in making ploughshares and other agricultural implements. Perched on a hill to the north is the village of Bádaleh; judging from the number of houses it must number from 500 to 700 inhabitants. We now crossed the water-parting and got into a valley with a wide plain sloping down gently from 7500 to 6200 feet, at the point of junction with the Chardeh valley. The hills on either side receded as we advanced, and those on the south gradually merged into the parallel valley in which is the Chashmeh-Ali. Some seven miles distant from the water-parting the surface of the surrounding country was found to be a thick deposit of clay and oyster-shells, one point 900 feet above the general level. This layer was cut up by the labyrinthine convolutions of innumerable stream beds. Evidently the soil was saline, as nothing green is found on these hills. At Manga, however, there is a copious spring, the water of which has created a fine pasture of several hundred acres in extent.

Here we encamped, the only supplies procurable being milk from a flock pasturing here. The night was cold, a strong and continuous wind blowing from the head of the Sir-i-Tang valley, and nearly causing the tent to fall over.

24. *Chaman-i-Manga to Chardeh.*—I found too late that had I hugged the northern side of the valley and marched viâ Túdeh and Namaká I should have debouched into the Chardeh valley close to that village; whereas I took the main road, and this led me first along the stream flowing down into the Chardeh valley, and then leaving it and making a detour amongst the winding contours of the low marly hills to the south, I finally came out into the Chardeh valley proper at the village of Kalateh, which is 10 miles south of the position of my destination. Kalateh possesses some 40 to 50 houses in two blocks, with walled gardens—mulberry and walnut trees—and is watered by numerous streamlets issuing from a brawling brook that comes out from a cluster of springs west of the village. We now turned to the left and followed the main road leading from Chashmeh-Ali to Chardeh, passing a broad width of wheat-laden fields and several ruined forts and remains of villages. We left Chaman-i-Manga at 5.45 and got to Chardeh by 9.30, putting up temporarily in the Bagh-i-Shah. This is one of the numerous royal gardens to be met with in Persia that are allowed to go to ruin, and intrusted to the care of a gardener who is glad enough to eke out his scanty salary by accepting a small gratuity from any traveller who desires to camp in the garden. Fath Ali Shah is credited with having founded this garden, and judging from the size of the chinar trees this is probable, as their calibre denotes an existence of about 70 years.

As regards the village of Chardeh itself, it is now the property of Mustafi-ul-Mamalik, and is a great depôt for mules trading with Khorassan. The style of the houses and the dress of the inhabitants are on the Irak model. A fine stream coming from the snows of the Shah Kuh range rushes through the village, and is subdivided and distributed by numerous side channels conveying the water to the fields. The four villages are disposed in a cluster, their distinctive names being Kíshásh, Wárzen, Surdáwán, Kaleh. They have numerous walled gardens, with rows of poplar and willow trees and stunted mulberries, and the inevitable Imamzadehs. Leaving Chardeh, and taking the road leading to Shah Kuh that enters a narrow valley north of the village, we proceeded for about four miles through wheat and barley cultivation until the valley turned sharp to the right. We then ascended to the left by a zigzag round a spur dividing the Caspian and Damghán basins as far as the Shah Kuh is concerned. The hills were very bare all round except in the northerly direction, where we perceived them covered with the mountainous stunted juniper bushes.

We then descended, crossed a valley with a broad torrent bed coming

directly from the westernmost peak of the rugged summits of the Shah Kuh; afterwards we turned up a narrow glen terminating at a watershed 8600 feet high, just beyond which we found a spring and encamped, having been marching for eleven hours.

25. *Camp near Chardeh to Ziarat-i-Khás-rud.*—To-day's march was equally long and wearisome. We had no guide, and though we did not lose our way, thanks to directions from wayfarers, we did not advance so briskly as we should have done if we had had a qualified person to show us the short cuts. Our course was easterly over the spurs of the north side of the Shah Kuh, as far as the neighbourhood of the village of Shah-kuh-i-Bala. Thence north to Charbagh, a gipsy encampment. Afterwards north-west up an ascent of 2000 feet to the water-parting looking over the vast steppes to the north. From that water-parting at an elevation of 9700 feet we descended to 5700 feet, and encamped at 6 P.M. after thirteen hours' marching, men and beasts thoroughly exhausted.

Our way over the northern spurs of the Shah Kuh was through a sparse jungle of juniper bushes. The road was pretty fair and passable for guns, except the 2000 feet ascent before mentioned. The view of the Shah Kuh mountain is very grand; it presents a wall of rock, furrowed, pinnacled, and practically inaccessible from about 11,500 feet to the general level of the summits, probably about 12,500 feet. This cliff rises sheer from the juniper-covered talus which forms the flanks of the mountain. An outer wall of the same rock that forms the summits, a dolomite apparently, rises from the general slope of the talus. At about two miles from the main mountain, and through breaches in its length here and there, the mountain streams issue out to the lower valleys. The village of Shah Kuh Páin (lower) is situated just behind this outer wall, between it and the mountain. I did not actually visit the village, as it lies out of the direct route, but we saw it at a distance. A Russian naturalist, a professor at the University of Dorpat, M. Petersen, was staying at Shah Kuh Páin. I met him afterwards at Astrabad. He reports the fauna and flora of the Shah Kuh range as scanty and not of much interest. There was considerable cultivation about Shah Kuh and in the lower valleys; but the hills are, generally speaking, of the usual characteristic Persian mountain scenery, viz. remarkable for their bareness. Walls of rock and stretches of down and valley speckled over with juniper shrubs form the stock characteristics of the scenery until the water-parting is reached. We crossed the road leading from Hajiabad to Shahrud pursued by Major Napier, and described by him. Then crossing a low watershed we came to a stretch of grass and pasture land along the banks of a stream. Here a tower and some inclosures stand, called Charbagh. From thence, by a winding, steep, but not rugged path, we ascended 2000 feet up to the great water-parting, and reached it at 2.30 P.M. Here the aspect of the landscape changed as if by magic.

Instead of the monotony and aridity we had experienced since leaving Mekhsás, we saw, beginning at an altitude about 800 feet below us, a dense and variegated forest of splendid elm, oak, and beech; this, with occasional stretches of vivid green sward interspersed amongst the thick masses of trees, clothed the mountains down to the margin of the boundless steppe which extended like the ocean until lost in the misty distance. The change was to my mind most pleasing and refreshing; but strange to say my Persian servants and the muleteers were differently impressed, and seemed completely insensible to the charm of the sylvan scenery. We left the water-parting, and after descending by a gently sloping road to about 8900 feet elevation, the forest commenced. We passed a spring of deliciously icy-cold water called Chashmeh Siah Kaneh, and at about 4 P.M. reached an open space from whence a view of the shingled roofs of the village of Ziarat was obtainable. The road after this was very bad, exceedingly steep, excessively muddy, and dangerously slippery; but the scenery of gradually increasing depth of forest and underwood was of great beauty. Finally, as one of our party had not rejoined after being sent to Shah Kuh for a guide, I decided not to attempt to reach Ziarat, but to encamp on the first favourable ground, which we reached at 5.30 P.M.

26. *Ziarat to Astrabad.*—The next morning early we proceeded downwards until we reached the main stream draining the valley. This we followed for about two miles until we reached the foot of the hill upon which Ziarat-i-Khás-rud is built. This village now consists of eighty houses, built mostly of mud and wattle, and roofed with shingle. The villagers own large herds of cows and flocks of sheep, and are tolerably wealthy. They also rear bees and derive profit by the sale of very excellent honey. Ziarat has a sulphurous spring, and being at an elevation of 3900 feet, and only two and a half hours' ride from Astrabad, is much frequented by the merchants of that town during the summer. The Khás-rud flows on for about eight miles through a most picturesque glen covered with forest, until it debouches into the easier sloping ground. There a canal takes off a portion of the water to some villages east of Astrabad. The main stream then maintains its course, furnishing a mill-stream that passes through Astrabad, and continuing also in its natural bed and passing west of that town. We reached Astrabad at 10 A.M., having been thirty-one days *en route*.

II. From Astrabad to Shahrud.

I subsequently surveyed the country lying between Astrabad and Shahrud. These two points have been astronomically fixed by Lemm, and as his observations are probably correct I assume the difference of latitude to be 25′ 39″. I adopted the scale 0·89 of an inch per statute

mile. The object of the survey was to map out the features of the intermediate district through which the telegraph line and the postal road pass.

I commenced operations by pitching my camp in the neighbourhood of Astrabad on some low hills to the south. These lower spurs of the lofty mountains nine miles south of Astrabad are densely clothed with forest. On one of these hills, called Sir Derwarzeh, I stayed a few days in July, the breeze from the Caspian being a pleasant change from Astrabad. Near Sir Derwarzeh there is a sulphurous spring much frequented by Astrabadis suffering from cutaneous affections. Thursday is a favourite day for these visits. The water from the spring is conducted into shallow reservoirs in which patients bathe, the water having been warmed by means of stones highly heated and thrown in.

From Sir Derwarzeh I shifted camp to Kiarat, about 10 miles from Astrabad. Owing to the persistent dry weather, the annual burning of the thorn thickets growing in the vicinity of Astrabad assumed this season quite the proportions of a conflagration. It was with difficulty we could force our way at certain points of the road through the flames on either side. I noticed that many of the yew telegraph-posts were fiercely burning. The road from Astrabad to Kiarat is flat, but wretched, like all communications near Astrabad. The farmers are no respecters of roads, and whenever their fancy leads them to think ploughing up the *de facto* highway will be advantageous, they do so; travellers have then to devise some other path, and get along in the best fashion they can.

Kiarat is a series of wide commons or pastures at the entrance of the pass into the mountains. This pass is called the Kuzluk. At one of these pastures at the entrance of the pass my tent was pitched; the temperature was considerably lower than at Astrabad, and there was a delightful absence of mosquitos. The scenery was still sylvan, as it is up to the top of the Kuzluk. The march from Kiarat to the pastures at Aliabad, three miles from the water-parting (7600 feet), is too long; it is best to break the journey by halting at Beland Sefaleh. On leaving Kiarat the road lies through the forest, forming a wide and umbrageous avenue. We passed through the portion of the valley called Garm Dasht, where a number of gipsies had pitched their tents. They generally employ themselves as blacksmiths and sieve-makers.

The scenery along the road, winding as it follows the torrents through these forest-clad hills, is grand. The wealth of timber is enormous; but communications and means of transport are so defective that these riches are utterly unavailable.

The actual ascent of the kotul of Kuzluk begins at an elevation of 3450 feet. The road was formed sixteen years ago by General Bühler, of the Persian service. It is not passable for horsed guns, but at the date above-mentioned and since, guns have been brought across, dragged by

bands of villagers, and lately some four-wheeled fourgons of the German type, crossed on their way to Chikislar from Meshed, where they had carried pilgrims from the Caucasus viâ Tehran. At an elevation of 4700 feet a stratum of gypsum is met with; and a little higher, a small serai called Robat-i-Kuzluk. Beland Sefaleh, where there is a spring, is reached at 5200 feet. There is an open down suitable for camping. At an elevation of 7200 feet, just before reaching the summit of the pass, another *robat* is reached, very useful for travellers during the winter, when great cold and deep snow prevail.

On reaching the top, the valley of Aliabad and Charbagh hemmed in by the Lareh and Lendi mountains to the north, and by the range of the Shah Kuh to the south, spreads out, descending from 7600 feet, the level of the water-parting, to 7100 feet in the neighbourhood of Charbagh. The scenery changes as if by magic, and the traveller, if acquainted with the general aspect of Persian landscape, realises that he is indeed in the land of Iran, so different in appearance from the Caspian provinces. The valley presents a dull, uniform, yellow-ochre tint, mitigated by a sparse sprinkling of funereal-looking yews, and hummocks of heather and thistles. Patches of verdure where some springs occur at Aliabad, and a few fields of stunted barley near a serai called Robat-i-Sufid, are the only evidences of life in this dreary valley that impresses the traveller after journeying through the gorgeous forest scenery of the Caspian littoral. I must remark, however, that on my return from Shahrud I thought this valley of Aliabad an improvement on the country I had lately traversed. Aliabad is now only a pasture; the nearest hamlet is Chárkhaneh. Its elevation is 7300 feet, and on the 31st July it was so cold at night that ice was formed in all the vessels in camp that contained water. I stayed a day at Aliabad and ascended the Lareh mountain (8600 feet), from whence I obtained a good view of Astrabad and of the village of Ziarat, where the dining tent of the Russian Consul formed a conspicuous object. Clouds, however, coming on, brought the survey to a close for that day.

On the next day I sent the camp and followers by the Jaling Miling Pass (7900 feet), to Haft Cheshmeh (8000 feet), and I went to the top of Pir Girdu Kuh (10,500 feet), from whence Astrabad was visible and the high peaks all round. At the summit of this mountain are several cairns, upon which are deposited votive offerings, consisting, as is customary, of copper ornaments called *kandil*. These are strung on a cord, and suspended to the bough of a tree if there be one at the shrine, or simply laid on the cairns, as in this instance.

I remarked on this peak, and on all high peaks I subsequently visited, that the hand of the inquisitive alchemist had been at work. Every peak bore evidence, by numerous holes dug about, that a diligent search for hidden treasures had been made. It is a very prevalent idea amongst Persians that the presence of hidden treasures can be ascer-

tained by certain *quasi* magic arts, especially by virtue of a certain herb found on the mountains. Shepherds and others, when anxious to know what I was about and what the paraphernalia of the plane-table meant, were perfectly satisfied by the reply of my survey porters that I was looking for this wonderful herb—for this *Alif-i-kimia*, as they call it.

Haft Cheshmeh consists of a series of patches of pasturage through which a stream from the northern flank of the Shahwar mountain runs towards Charbagh. From one of these spots, where I pitched camp, to near Tash, formed the next march, by way of the Wăjmănú Pass (9000 feet), and thence along a stream flowing south until its junction with the water-course that runs past Tash, distant about one mile. The rocks adjacent being perfectly bare, it was easy to see they were composed of marls, shales, and bands of sandstone. There are deposits also of fullers' earth, very white and not unlike chalk in appearance. At Tash (7700 feet) there is a telegraph office, as interruptions during the winter are frequent. The Persian telegraphist stationed there complained bitterly of the inclemency of the weather and the monotony of existence; it is doubtless looked upon as a penal station. There are about fifty houses with two hammams. Fuel is scarce, so are wheat and barley. The wealth of the villagers consists in their flocks of sheep and goats; but these, instead of being at hand, had been compelled by the dryness of the season to seek pasture on the Kalposh plateaus, now safe from Turkoman raiders.

The junction of the Tash stream with that flowing from the west along the Chalchilian Pass is about three-quarters of a mile to the south of where I pitched camp as described, and is called the Doáb. A small serai exists there and some patches of cultivation. I noticed lucerne growing here; it cannot be got to grow favourably at Astrabad. About two miles lower down stream through the defile called the Dahan-i-Tash, or the Rock's Mouth, there is another small serai called Robat-i-Tijir.

At this point we emerged on to a fine, broad, flat valley, hideously barren and sterile. It is about 12 miles long by from two to five broad, eventually merging to the east into the plain of Bostam. It is bounded on the south by arid and precipitous limestone hills of the Tapal range, and on the north by the easier slopes of the grand Shahwar mountain.

A small village has lately been built close to Robat-i-Tijir called Kaleh Noa, at the foot of the Shentu hill, the end peak of a spur from the Shah Kuh. I am told there is a cave on the north side of this hill where stalactites are found—a proof perhaps of a moister climate in bygone ages than at present.

I may here observe that the change in the hygrometric conditions of the atmosphere is immediately perceptible on passing the Wăjmănú Pass; the dryness of the air makes itself disagreeably evident, by one's nails splitting, and by the dryness of the throat and nose which is produced.

From the highest peak of Shah Kuh, reputed to be 13,500 feet, a spur trends to the south-east terminating at Shahrud, and another runs east terminating at Kaleh Noa. The former is the Tapal range, the latter the Shentu. In the apex between them, amidst the ramifications of the lower spurs, are the villages of Mojin and Tăzrí.

Major Napier describes the road from Tijir to Kelateh towards Shahrud as waterless. This is strictly the case as regards the road; but south of it, a little distance across the dry bed of the main water-course, there is a canal with an abundant supply of fresh water, derived from the Dahan-i-Tash. Near the ruins of Mahamadabad (5900 feet) a chain of karezes commences, and three miles east of this is the small village of Kelateh (5150 feet). On the north side of the valley, at the mouths of glens of the magnificent Shahwar mountain, are the villages of Nikaramand, Aversin, Mogan, and Deh Khail. The town of Bostam lies about five miles from the outer low hills of the Shahwar, encompassed by orchards, gardens, and fields, watered by karezes and by the canal above mentioned. Some of the karezes are very deep underground, the shafts being sunk 400 feet in the neighbourhood of Kelateh. Bostam is the seat of government of a not inconsiderable province. The present governor is Mirza Bakír, a subordinate of the Mustafi-ul-Mamalik. The town of Bostam is rectangular, inclosed by high mud walls, with towers at intervals; a portion being occupied by a citadel or *arg*. The existing defences are sufficient to repel Turkoman inroads, which are now happily suppressed, but thirty years ago these adventurous marauders traversed the open plain of Bostam in all directions, raiding and carrying off flocks and herds, the timid villagers not venturing to cut off their retreat: so daring were they, that, leaving the plains, they penetrated into the mountains to Tash and the village of Shah-kuh-i-Bala. It is inconceivable, considering with what perfect ease the approaches to these places can be defended, how these outrages could have occurred; the conclusion seems to indicate not so much Turkoman valour or prowess as Persian cowardice, timidity, and want of union.

At Bostam I visited a remarkable brick-tower of ancient date. Its architecture strongly resembles that of the Kotul Minar at Delhi, having, like it in plan, a polygonal outline of salient angles. It is, however, only 50 or 60 feet high; the cupola has been ruined, but it has a frieze or cornice of terra-cotta tiles with Kufic inscriptions in relievo, each tile bearing a distinct impression. A complete copy of these would probably furnish the cue to the history of this remarkable monument. Two impressions were taken by Consul Bakouline some years ago; but a perfect set is requisite to elucidate its history. There may possibly be 200 separate tiles. I also visited the shrines of the Imamzadeh Mahamad and of Sultan Biazid, not the Sultan of Turkey, but a chief of a sect of dervishes. These buildings that are ornamented with some *Kashi* tiling are about 300 years old. Close by is a Minar, curious for possessing

the same property that makes the shaking towers of Ispahan famous. When shaken by a man standing at the top, it oscillates and vibrates sufficiently to cause a brick, placed on the edge of the cornice, to fall. It is about 35 feet high and 6 feet diameter at base, tapering gently upwards. This curious vibratory property is attributed at Bostam, as it is at Ispahan, to miraculous interposition of the local saint. It is of course due to the elasticity of the bricks and cement used, the latter becoming more elastic by age; and it is not more curious than the phenomena presented by slabs of elastic sandstone found in various parts of the world.

Bostam has seen its best days many years ago; although still the seat of government, it is completely eclipsed in importance by Shahrud. This town has much increased since I visited it in 1872. Much of what then was garden has been built over. A new bazaar with 100 shops has lately been built by Abdul Kasim, a merchant of Astrabad. There are now six Russian-Armenian firms, who own some rude cotton presses, using them to press the bales sent from Subzewar and other districts. The bales are afterwards taken by mules and camels viâ the Chalchilian Pass along the Nikah river to Gez, and there shipped to Astrakhan. Shahrud now possesses a post office and a telegraph office, from which the wires to Meshed and to Astrabad are led.

Shahrud, at the time I visited it, was very hot; it was filled with pilgrims going to Meshed. There was a regiment from Tabriz encamped there also on their way to Meshed. Some Indian pilgrims who called on me related how the soldiers pillaged right and left on the march from Tehran.

The villagers at Shahrud are far more industrious than those about Astrabad, where nature is so productive that labour is almost superfluous. At Shahrud nothing grows but by dint of digging, delving, manuring, and irrigating; consequently habits of industry have been developed, and the result is that the fruit and cereals about Shahrud are far finer than those of Astrabad, to which place they are exported.

For threshing corn, instead of the usual method of treading it out with four or five ponies made to circle round and round over a heap of straw, they use a sort of trolly with fans around two axles, and two iron circular cutters. The husbandman sits on this contrivance, which is drawn by a couple of mules or ponies. It not only threshes out the corn, but effectually breaks up the straw for fodder. The machine costs about eight or ten shillings. I pitched camp in the Sipar Salar's garden. The garden where the Sistan Special Mission encamped ten years ago, has now been built over.

On my return towards Astrabad from Bostam I put up for one night at Nikaramand, a small dilapidated village at the foot of the Shahwar mountain. It is at an altitude of 7050 feet. The air was cool and pleasant. The village belongs to Ali Khan Agha, the head of the

Astrabadi Kajars, who is a rich old man owning a good deal of property about Astrabad. He complained much of the season, and said he had lost a great deal by failure of the rice crop and the general dryness. He is not considered a good landlord by his villagers. From this village I proceeded the next day along the base of the Shahwar until we reached a glen, up which we ascended to a spring called Dehi, at an elevation of 8800 feet. Here I pitched camp to enable me to ascend to the summit and return before sunset.

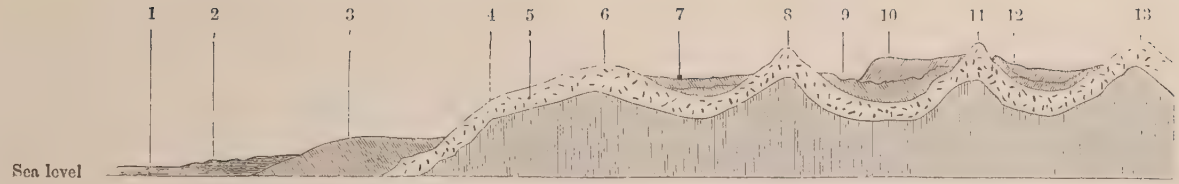
The ascent up to 12,500 feet was not difficult. I rode on a mule all the way. The path led us to the western face of the mountain from which the village of Tash and the peaks of the Shah mountains, together with Mounts Pirgirdu and Lareh, and all their lower spurs, were plainly visible. The ground was slightly covered with reddish marl and débris of the limestone rock of which the huge mass is composed, and showed the pulverising effects of the winter frosts very markedly. On our way to the summit we disturbed a herd of fifteen mountain sheep, who on our approach bounded down the precipice towards Tash. Usually there are great numbers of these animals, but owing to the want of verdure this year they have migrated to the edge of the Caspian forests. From the top, where I hoped to have had a view of Astrabad, I found, to my regret, thick clouds lying all over the Turkoman steppe, but to the south, Shahrud, and Bostam, and the desolate salt desert of Damghán were clearly seen. The temperature at 2 P.M. was about 40° under a bright sun. The descent on foot to our camp at Dehi occupied about two hours, and *en route* we saw herds of mountain sheep, or *ghosh*, numbering 28 head. The next day we descended by a rugged path leading westwards, rejoining the main road at Robat-i-Tijir. Thence we went to Tash, where I explored the coal-mines mentioned in Major Napier's report. I found the locality was about 1½ mile from the village of Tash, on the north of the main stream running from the summits of the Shahwar mountain. It was first brought to the villagers' knowledge after a heavy landslip had occurred, a convulsion which brought to light the seams of coal. The Russians about fifteen or twenty years ago investigated this source of fuel with a view to possible utilisation for steamers on the Caspian, but the superior advantages of refuse naphtha for fuel have destroyed all interest in these mines for that purpose. I had a brisk fire of drift-wood made to test the combustibility of the mineral; on this I placed several pieces of coal, obtained by digging into the seam for about two feet, to avoid using material that had been weathered. The coal smoked, but never ignited properly, although the conditions were not unfavourable. I therefore think these seams, like those I also saw near the village of Shah-kuh-i-Bala, are beds of lignite. Doubtless in combination with other fuel and with proper precautions, its combustion is practicable; but for ordinary use by the villagers for heating their hammam, or lime-

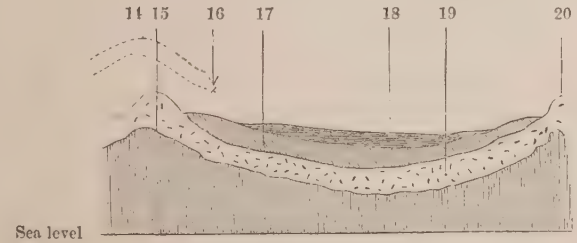
burning, I fear my suggestion to the Kedkhoda of Tash to make a trial will result in failure.

From Tash my camp went by the easy road over the Chalchilian to opposite the village of Shah-kuh-i-Bala. The path I followed over the hills to the south of the road was difficult of ascent until the plateau was reached. The country is sparsely studded with juniper or yew trees, some of considerable size. The air too felt less dry than towards Shahrud. The village of Shah-kuh-i-Bala is situated at a height of 8200 feet above the sea, and above the level of the stream running at the foot of the glen, on which its 50 to 80 houses are grouped. The winter is very severe here, and the villagers' crops this year nearly all failed; fuel has also to be brought from a distance, and lately "fluke" has played havoc with their flocks; consequently many have migrated temporarily to more genial habitations nearer Astrabad.

From Shah-kuh-i-Bala I descended into the Charbagh valley, and crossing it ascended the Lareh Mountains, passing over into the Ziarat valley by a pass at a level of 9200 feet. The head of this valley is bare, the rock being marls and limestone; but at the level of 8500 feet the thick forest begins, chiefly oak, succeeded by beeches, elms, sycamores, maples, &c. The road down to Ziarat crosses the main spur of the Lareh Mountains, passing by two clearings, one called Siah Kaneh (7700 feet) and the other Sherbett. The latter is a corruption of Shuhr-i-Ḅút, so called from some ruins found here which legend pretends belong to the time of fire-worshippers.

I encamped at Siah Kaneh, and sent the camp next morning direct to Ziarat, myself retracing my steps to the pass, and thence going on to Mount Lendi, taking bearings. The valleys to the west presented here and there great stretches of fine pasture land, ordinarily affording heavy crops of hay, but this year they were quite brown and burnt up. The stretch of country to the west between the Ziarat valley and the Jehan Namch peak is not well known, and would require a fortnight's survey to clear up. I followed a path to Ziarat passing by Bazi-kash pasture, and descending by a difficult pass directly west of the village, where I found the Russian Consul and his family. The village of Ziarat is distant three to three and a half hours' ride from Astrabad, and is about 3400 feet higher than that town. This difference of elevation makes the climate agreeable, the temperature being from 12 to 15° Fahr. lower than at Astrabad. At night a steady breeze blows from the Lareh Mountains to the south, and about 7 or 8 A.M. the sea breeze sets in, although the valley itself has no outlet directly open to the Caspian; but the cooler sea air, with or without clouds, finds its way up the windings of the Kasu Rud, on which stands the shrine of Abdullah, from which the village takes its name of Ziarat. It is an ancient village for Persia; I have seen the charters granted to the keepers of the shrine by Shah Sultan Ismail (A.D. 1580), and also by Shah Suliman. The charter or





1. Astrabad.
2. Alluvium.
3. Marl.
4. Kala Girdun.
5. Compact limestones.
6. Larch Mts.
7. Aliabad. Marls, gypsum, breccias.
8. Pir Girdu Mt. (specimens).
9. Marls.
10. Shales (specimen).
11. Specimen, near Shah-kuh-i-Bala.
12. Shales, marls, lignites.
13. Shentu Mountain.
14. Shahwar Mountain (specimens).
15. Shentu Mountain.
16. (Specimen.)
17. Marls.
18. Alluvium.
19. Limestone.
20. Tapal Range.

SECTION ACROSS THE HYPOTHETICAL GENERAL DIRECTION OF ANTICLINALS, FROM ASTRABAD TO SHAHRUD.
Horizontal scale, 4 miles to an inch; vertical ditto, 12,000 feet to an inch.

firman granted by the latter was quite legible, and the style differed not greatly from what would now be written; but the firman of Sultan Ismail was illegible by anybody at Ziarat, although, besides the consular munshis, there were several "learned" men who had taken up their abode in the village to avoid not only the heat of Astrabad but the plague of mosquitos, and to escape fever which was there, as usual, intensely prevalent.

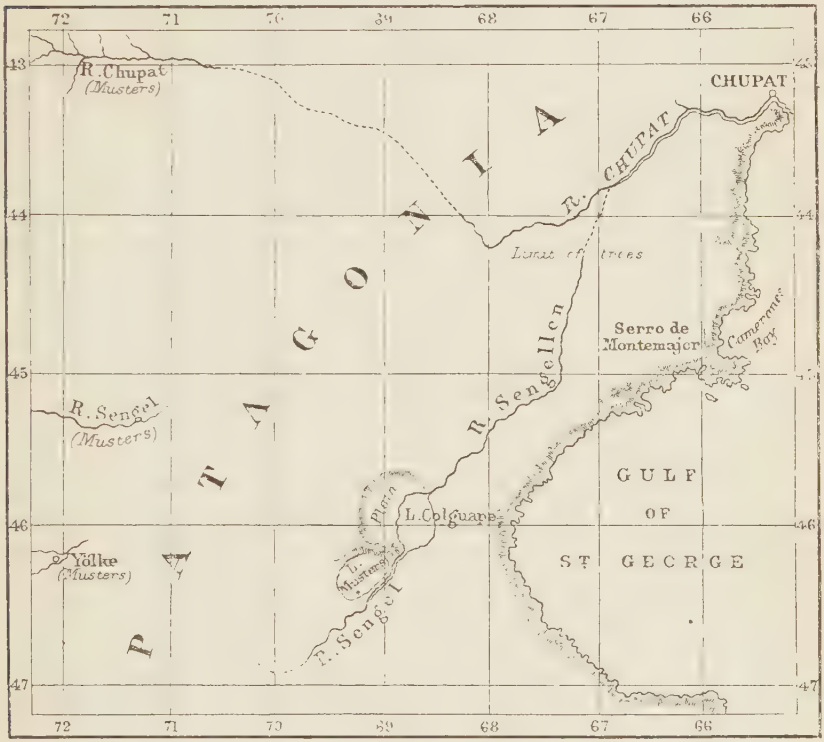
In conclusion, as regards the geology of the tract of country represented by the accompanying map, I am incompetent to give more than doubtful information. It appeared to me that the primary rocks are absent; I met no traces of granite or trap. I think all the rocks are secondary: the summits generally of compact limestone; the valleys of strata of marls, sandstone, and shales. I found in the shale at Haft Cheshmeh, on the *south* side, the impressions of leaves of plants. In the limestone forming the peak of Lendi Mount are imbedded great numbers of Belemnites. It seems to me the section of the rocks from Astrabad to Shah Kuh peak is as shown above, p. 83.

The discussion which followed the reading of the above paper will appear in the next number of the 'Proceedings.'

Mr. Durnford's Explorations in Central Patagonia.

Among the recently discovered papers of the late Mr. Henry Durnford, an ornithologist, who died in 1878 during an exploring expedition in Central South America, were some notes on a second visit made by him to the Welsh colony of Chupat, in Eastern Central Patagonia, during the autumn of 1877, and which are evidently the base of the accounts referred to in the note to p. 47 of Petermann's 'Mittheilungen,' vol. xxviii. (1882), as sent by that gentleman and Mr. Thomas to the Argentine Ministry, hitherto unpublished. These have now been inserted by his brother in the *Field* newspaper for 23rd and 30th December last, and contain some interesting observations on the geography and hydrography of this little-known region. Though adhering to the usually received rendering, "Chupat," Mr. Durnford states that, according to information from many Indians of independent tribes, the correct pronunciation of the name of the river is "Chūba," which, according to Señor Onetto, the commissary of the colony, means, in Indian, "erosion." If this be correct, the river has doubtless been so called from its flowing rapidly in the interior between precipitous rocks, where frequent and extensive landslips were observed by Mr. Durnford. It is rendered "Chubut" by the distinguished naturalist and explorer, Señor Francisco P. Moreno, who in his 'Viaje á la Patagonia Austral' refers to information derived from Mr. Durnford.

Mr. Durnford started on October 22nd, with Mr. John Griffiths and Mr. Lewis Jones (original promoters of the colony, also mentioned by Señor Moreno), and practically followed the coast-line in a southerly direction until November 1st, when they struck inland. The route from the Chupat colony to the top of Montemajor heights (about 44° 57′ S. lat., at the northern extremity of the Gulf of St. George), where the coast-line was left, had been through a very barren country, the lagoons in the deep rocky gullies of the table-land being nearly always dry, in spite of which guanacos were extremely abundant. The view from the



heights (about 750 feet above sea-level) was very fine, the country between them and the sea being dotted with salt lakes. The nights were very cold, and ice was found in the kettle every morning.

On November 1st, they travelled about 22 miles as nearly as possible west-by-south following the compass, and camped in a deep gorge with a permanent stream in its bed, surrounded by round hills of *tosca*—a marly arenaceous rock found imbedded in layers and nodular masses among the argillaceous earth of the pampas. Ten miles from this point, a small river flowing almost north and south was found; this is usually called the "little river" at Chupat, but has seldom, if ever, been before

visited by any of the colonists, and was named by the travellers "Sengellen," the Welsh diminutive for Sengel, being found to be practically a continuation of the latter river. When seen on November 3rd, it was about 60 yards in breadth, the water thick and muddy and the stream rapid. The valley was about three miles wide, and the soil a stiff white clay. From the 5th to the 8th November, the valley was followed up-stream, the river winding considerably, but with a general course S.S.W., and at one point having a ford. As Mr. Durnford and his companions continued their way, the *barrancas*, or steppes bordering the valley on either side, became higher and the valley narrower, whilst red volcanic rocks of various fantastic shapes and tosca hills reared themselves on both sides. On the table-lands above the barrancas, they saw everywhere traces of the action of the sea in well-rounded pebbles, gigantic oyster-shells, and numerous fragments of smaller shells. During the 7th and 8th of November, the river was observed to flow through lagoons, which in some places reached quite across the valley, barely leaving room to pass; these were surrounded by extensive reed-beds and contained thousands of wild fowl. One of the chief objects of the expedition had been to actually visit the lake "Coluguape," reported to Lieut. Musters by the Indians, and which appears on some old maps as "Coolu-Huape," although its position and value in the hydrographic system of the Chupat had not been fixed. This lake has been, for no apparent reason, re-named "Dillon" by Mr. Thomas, in which he is followed by Moreno, who ignores Coluguape: Thomas also re-names the river Sengel "Younger," an innovation rejected by the Argentine geographer.

In this object the travellers were successful, as on the 8th November they were close to it, in comparatively fertile pastures, Mr. Durnford fixing the position by solar observation and finding it to be lat. 45° 38′ S., long. 68° 19′ W. By dead reckoning, the position was lat. 45° 57′, long. 68° 38′, Mr. Jones fixing the point still further southwards.

Mr. Durnford states that the Indian name "Colguape" signifies a lake (*guape*) in the form of a bag or sack, but he failed to see the appropriateness of the term. There can be no doubt that his "guape" is the Indian "Huape," or "Huapi."

The lake was found to be a large piece of water of irregular shape, running generally north and south, but with neither end visible: its length was subsequently estimated at about 20, and its breadth at 15 miles. On the east side were a group of smaller lakes, in some cases united by a narrow channel to the main one. The whole lake appeared surrounded more or less by high hills and volcanic rocks. Right at the mouth of the Sengellen, and on a moderately high hill overlooking the lake, an Indian cairn containing a human skeleton was found, and many more were subsequently observed. These cairns, except in one instance, were invariably placed on the top of some high hill or rock. They are oblong in shape, becoming narrower towards the top which ends in

a sharp ridge, and vary much in size, being evidently built up with considerable care, for the stones are arranged with great symmetry, the larger ones below and the smaller above. The construction of these sepulchres must sometimes have been a work of great labour, for in one case the stones, which Mr. Durnford could not move alone, must have been carried at least a quarter of a mile up a steep hill. The exception mentioned above was in the valley of the Sengellen, where, for some reason, the cairn had been built at the foot of the hills bordering the valley. It was a very small one and possibly covered the remains of one of two individuals, the survivor having been unable to drag the corpse to the top of the hill.

The travellers continued along the southern shore, arriving at sunset at a point near to which the river Sengel (Senguel, or "Singuerr," as pronounced by the Indians, according to Moreno) empties itself into the lake. The last two-thirds of the day's journey were over an extensive grassy plain, very low, scarcely above the level of the lake, with very abundant pasturage, affording food to large numbers of rheas, guanacos, and hares, and stretching from the mouth of the Sengellen to that of the Sengel, and inland from the lake for fully 20 miles. Mr. Durnford believed that this plain once formed part of the lake and that the latter is gradually drying up, an opinion strengthened by the fact that the plain was dotted here and there with smaller pools, whilst no bushes grew upon it. The water was only knee-deep at a distance of forty or fifty yards from the shore, the bottom being of mud and covered with vegetable growth.

A few miles from its mouth the Sengel was about 80 yards wide, the stream flowing rapidly and the water clear, the depth in the middle being considerable, but at its actual entry into the lake it flowed through thick reed-beds.

After following the river for some 10 miles west-by-south, the party came to another lake on its left bank, having apparently (beyond a very slight overflow) no communication with it, and being divided from it by about a hundred yards of dry land. This lake, if not actually larger than Coluguape, seemed to contain a larger body of water; it was separated from the first lake by a range of hills and was surrounded by steep and jagged rocks. Moreno, *l. c.*, p. 39, proposes to call it "Musters," in honour of the deceased Patagonian traveller.

Mr. Durnford well observes that there are several points connected with these lakes which require explanation, and to the elucidation of which future explorers might well turn their attention. How can we explain the fact of such a comparatively large river as the Sengel entering Coluguape, and an insignificant one such as the Sengellen leaving it? If Lake Musters really has an overflow into the Sengel, as appeared to be to some extent the case, can this be explained on any other supposition than that there is some river flowing into that lake from the northward?

Continuing their journey along the river, the travellers found that the plain ceased in about 15 miles, the valley being then about three miles broad. They attempted in vain to cross the Sengel, both by swimming and rafts, and on November 15th pushed up the valley for about 20 miles and camped at the foot of a high volcanic hill, on the summit of which were two Indian cairns. Next day the valley was found to be clothed with luxuriant pasture, but kept gradually narrowing until it was a mere deep cutting between the rocks, which formed steep banks from 300 feet to 400 feet high, through which the river flowed in a deep and rapid stream. On the 17th, after travelling two or three miles, they found the river took a sudden bend to the north-west. The valley was bounded by a high barranca, and from its summit plains could be seen stretching to the west and south as far as the eye could reach, just the hunting-ground the Indians like. Game, however, was scarce, owing, no doubt, to Indians having lately passed that way, of which there appeared traces.

It was therefore determined to return, and on November 19th the journey back commenced. The furthest point reached was fixed by Mr. Durnford at 46° 50′ S. lat., 69° 50′ W. long., Mr. Jones putting it a few miles further south by dead reckoning. From the top of a hill near the furthest camp the course of the river could be traced to a point, apparently 20 miles distant, in the direction of N.W. by W. The country showed everywhere the same barren sterility, occasionally relieved by a lagoon or gully containing pools of water. Bare tosca hills and cliffs, and volcanic rocks of every shape and colour, from pale brick red to black, constantly confronted the travellers and wearied the eye with their monotony. At one moment they ploughed their way across acres of soft, yielding dust, at another their horses' shoes rang on hard, unyielding rock. Everywhere the birds, the quadrupeds, the flowers and bushes, were the same—stunted and dwarfed. Only one bright line shone out conspicuously, the fresh clear river as it wended its way amongst the hills and plains, carrying life and activity to everything in the valley through which it passed.

The return was made by the same route until November 27th, when the point was reached at which the Sengellen was first touched, and it was determined to follow that river to its junction with the Chupat, instead of returning by the coast-line.

On the 28th they travelled N.N.E., at noon reaching red volcanic rocks, which increased in height on both sides of the valley as they advanced, the latter getting constantly narrower. On the 28th, travelling north-by-east, they came to the first willows, which gradually increased in number and size, and continued on both sides of the river to the close of the journey. These were the first trees seen since leaving the colony, and they looked wonderfully fresh and green. Mr. Durnford was of opinion that their range must be governed by the temperature, for it is

hard otherwise to account for their sudden appearance, the banks of the Sengel as well as the Sengellen being apparently well suited to them. He made this point to be 44° 15′ S. lat.

On the 28th the only way was on the top of the barranca, the rocks in many places descending sheer into the river, rising from 250 feet to 300 feet in height, and often presenting very curious and fantastic shapes. It was not unusual to meet with oval or circular holes from two feet up to 10 feet in diameter, and three or four feet in depth, worn in the surface of the rock. The explanation of the origin of these was that a small stone had originally lodged in a natural crevice, and then been whirled round by the wind until, in the course of time, a large cavity was formed in the same way that stones on snow or insects on sand gradually form disproportionately large pits. In one instance a hole had been thus bored right through a projecting pinnacle which reared itself many hundred feet above the river-level.

On December 1st the Sengellen was left, and a start made for the Chupat, which was here flowing almost parallel with the route followed for the last few days. When about 25 miles had been covered in a straight line, a halt was made, and after a day's rest another 25 miles over extremely rough ground took the travellers into the valley of the Chupat, which they followed for some distance, finally camping about 30 miles from the outskirts of the Welsh colony. Next day (December 4th) they passed the spot where the Sengellen joins the Chupat, and soon reached Tre Rawson without further adventure.

Mr. Durnford's route for the greater part covers and anticipates by three years that followed by Señor C. M. Moyano in 1880, and described by the latter in his "Informe sobre un Viaje a traves de la Patagonia," in the 'Boletin del Instituto Geografico Argentino,' 1881, ii. pp. 1–35, with map, which is referred to in the summary of recent information on Patagonia given in Petermann's 'Mittheilungen,' mentioned at the commencement of this note. Comparing his results with Petermann's map (1882, Taf. 3), and the for the most part hypothetical one of the region given in Musters' work, it will be seen that they are approximately correct. His details of the lake do not, however, accord with those given by Petermann from Moyano's observations; but the greatest discrepancy is the position so near the coast ascribed by Durnford for the junction of his Sengellen (the Sengel of Petermann, *l. c.*, p. 47) with the main Chupat. This is definitely given in Petermann as situated at 43° 37′ 30″ S. lat., and about 65° 42′ W. long. (Señor Moreno, judging by the map, did not actually visit the junction), and is so placed in the sketch map accompanying this paper; but according to Mr. Durnford's distances, the junction would seem to take place considerably to the east of that position.

Notes on North-Eastern Borneo and the Sulu Islands.

By W. B. Pryer, British North Borneo Company's Resident, Elopura.

The north-east coast of Borneo, though apparently connected with the Sulu Archipelago by the promontory called Tanjong Unsang, and by a series of shallows and banks in continuation of it, is of quite different formation, most of the islands of the archipelago showing evidences of volcanic action, none of which are to be found in Borneo, or at all events not in the northern part of it, the nearest approach to anything of the sort being a hot mud spring on the island of Malwallee, which, however, I myself have only heard of, not seen. As might be expected, the soil of the archipelago is of a particularly rich and fertile character. In North-eastern Borneo, or Sabah as it is called, the formation is principally sandstone, with limestone in a good many places, the latter frequently forming steep, sharply angulated peaks.

One of the chief geographical features of Sabah is an enormous low plain, bordered on the north side by the Labuk Hills, the west by the mountains of the interior, and on the south by the hills crossing to the root of the Unsang promontory, comprising altogether some 4000 square miles. In this district there is a very heavy rainfall in addition to the drainage from the extensive series of mountains at the back, and as a consequence rivers are numerous and large, the principal being the Kina Batangan, the Labuk, and the Monud. The Kina Batangan is noticeable for its extraordinary windings, its stream having to be followed up for some 350 miles before a direct distance inland of 80 miles is gained; the Kina Batangan has been ascended by steamer for the first 150 miles of its course. Many other fine rivers there are, including the Terratum, the Sapi, the Segawah, the Maroap, the Alfred, the Segaliud, the Sekong, the Sapa Guya, and innumerable smaller ones; the banks of nearly all of these rivers are uninhabited. The greater part of the rest of the country is hilly, the formation of the ground being generally in somewhat sharp ridges. It is a question whether a considerable part of the interior is not a gradual slope, the land rising from the east coast till it culminates in the chain of mountains which run down south from Kina Balu; if so there should be a considerable extent of country at an elevation sufficient to render it suitable for European settlers.

The great lake to the east of Kina Balu, hitherto marked on all maps, is non-existent, nor is there even a swamp in its place, the country being very hilly, not to say mountainous. This fact, I believe, I was the first to absolutely ascertain during a journey to the interior which I made in August 1880.

The Sulu Archipelago is extremely lovely: none of the islands are very large, but they are mostly well shaped and hilly, with nearly all

the trees cut down upon them, and fairly well cultivated; they are surrounded by beautiful white coral strands, which, with the verdant hills, the blue sea, the coolness of the atmosphere, and the pleasant light breeze usually blowing, make them unusually attractive for places to reside in, in the tropics. They are fairly well populated; the little island of Sugh, the residence of the Sultan, measuring about 20 miles from east to west, and eight or nine miles north to south, is estimated to contain some 20,000 people; most of these are Sulus (Malays, with a considerable infusion of Arab and Chinese blood). Everywhere amongst the islands, leading a nomadic life in their boats, each boat containing an entire household, are to be found the Bajaws, or sea-gipsies; some of the islands to the south—the Tawa Tawis, Semoonal, Omaddal, Sepangar, &c.—being almost entirely populated by them. The Sulus are much the higher of the two in character, being proud and independent, with an aristocracy of their own, and being of a masterful but drone-like nature, they generally manage to get some one else to do any hard work for them. This refers more particularly to what may be termed the Sea-Sulus, or those living on the coast; the "Orang Gumber," or men of the hills, are a much more industrious and hard-working people, and less addicted to roving than the Sea-Sulus. In build the Sulus are slight, and a good many of them, particularly the "aristocracy," undersized; they are very courteous in disposition, well know right from wrong, and in the course of time a good deal may be made of them. The hill people cultivate their crops steadily, but they are a good deal harassed by their more powerful neighbours, while the Coast-Sulus take journeys to other countries, trading or collecting produce, with which every sandbank, reef, foreshore, and forest abounds; they are capable of violent exertion for a short time, but will then simply idle away their time, doing nothing whatever by the week together in the intervals.

The Bajaws are a stronger and rougher race, broad-shouldered and muscular, of a far lower type, hardly knowing wrong from right, timid almost as wild animals, but capable of a dog-like fidelity to those in whom they have gained confidence; they have such indistinct ideas as to personal property, that even their chiefs in some places cannot plant coco-nuts because the buried nut is sure to be dug up for eating within a fortnight, and so little thought for the future that it is actually a fact that Bajaws have been known to throw overboard rice by the bagful rather than carry it about with them in their boats, although within a few days the family would for want of it be certainly reduced to a diet of nothing but limpets and fish. It is dangerous for trading boats to go into some parts where the Bajaws form the bulk of the population, as the crew may be murdered at any time and the cargo divided without their being conscious that they are doing anything particularly wrong. They are in a great measure oppressed by the Sulus, whose chiefs "requisition" them for anything they want that the Bajaws can make or collect,

while Sulu traders establish themselves near every community, and carry on a barter business at extraordinary rates of profit.

The archipelago is almost entirely peopled by these two races; but on the coast-line of Borneo there is to be found an extraordinary mixture of people. At Melapi, the first village up the Kina Batangan (60 miles from its mouth), for example, there are to be found Sundyaks from the interior (the nearest approach to a true aboriginal type), Malays from all parts, Javanese, Sulus, Bajaws, Bugis, Chinese, Arabs, Klings, and many others; while of the Buludupies, the indigenous inhabitants of this district, there are hardly any of pure blood left. In the course of time a most extraordinarily mixed race will arise in Sabah.

The Buludupies inhabit the country bordering the coast-line from Paitan on the north to Silam on the south; they are an interesting race, their ancestry being doubtful, and they seem to show distinct signs of a Caucasian type. Probably they are but a tribe of the Sundyaks of the interior, which however, I must say, they themselves strongly deny. It may be expected that in a few years this race will have become extinct, or merged into a common stock which is rapidly spreading over this part of Sabah.

The rest of the interior of Sabah is inhabited by various tribes of the race styled Eriaans, Dusuns, or Sundyaks, the latter being by far the preferable name. These people are, I believe, descendants of the original Dyak stock of the country, with some admixture of Chinese blood. This has been denied by some writers, but I think existing traditions and facts are both too strong to be contradicted. It is, at all events, strange how thoroughly all traces of Chinese art, speech, and dress have disappeared; but undoubtedly in former times a large trade was carried on between China and North Borneo, and I take it that many of the sailors and traders going inland married amongst the tribes, and, as is usual even now, were not allowed to take their wives away, but had to settle down in that particular district, no doubt, as also is sometimes the case even now, adopting the dress and speech of the natives. According to this theory, there never was a Chinese-speaking place on this side of Borneo (as I have seen it asserted there was on the Kina Batangan), but the infusion of Chinese blood was a slow infiltration, the native speech, manners, and dress always being paramount.

The slavery of these parts is of a very mild character, the slaves frequently dressing as well and wearing as fine creeses as their owners, and frequently going long journeys with or without leave, occasionally even visiting British ports without claiming their freedom, and returning to their master's house when in any difficulty; the whole institution, in fact, partaking of the nature of clanship rather than of what is understood by slavery. Of course the more of these slaves or retainers a Dato or chief had the greater was his reputation; and in proportion to his power the people were content to take shelter behind him, allowing him

very much what he wanted as long as he was able to protect them against others. It was not considered "good form" for a Dato to sell his own people, though there was a good deal of trafficking in slaves who came into their hands in payment of debts, or as captives, &c. The tendency of slavery, however, is demoralising, as tending to prevent people thinking for themselves, as leading to too easy relations between the sexes, and thereby preventing domestic life, and in various other ways.

All the sea and shore tribes in these parts are Mahommedan, but not of a very strict type, and many of their customs are looked upon as very reprehensible by more orthodox Mussulmans. They are, of course, polygamists. One of their customs is rather curious: when a Dato of any consequence marries he settles upon his bride a dowry of so many slaves, male and female, so many pieces of T cloth, of silks, chintzes, and sarongs, all to trade with, as well as some seed-pearls or other valuables in hand as a capital to fall back upon; a house is built for her, and she is settled comfortably. At the end of a few months the roaming fit comes over the Dato and off he goes elsewhere, where generally a similar performance takes place. Nearly all women of any rank are clever, somewhat masterful, and very well able to take care of themselves (these qualities are engendered in them by having under their charge from an early age slaves whose intelligence is entirely surrendered to them); so the temporarily abandoned wife chooses one or two of the more capable men from those given her, who are fitted out and sent away on trading or produce-collecting excursions, while others are set to clear the ground, plant potatoes, bananas, &c., and the women are employed about the house. Matters proceed in this way till some fine day the Dato sails back again to find in every port a house, a wife, and surroundings all comfortable and ready for him.

Thus the sea people lead a free, wild, nomadic life with many virtues and but few vices, are idle and healthy, have a strictly adhered-to code of morality, strong feelings, and at all events are capable not only of being governed but of being of considerable assistance to Government if dealt with in an easy but firm and just manner; one of the strongest sheet anchors of Government in these parts is the maintaining the power of every one, down to the lowest Bajaw, to have the right of personal audience with the representative of Government. This is of course altogether at variance with our Western notions.

Being used to small well-cleared islands over which the sea breezes have no hindrance in playing, the coast tribes find the rivers of the mainland very unhealthy, running as they do through high primeval forest, mist-laden in the morning, hot in the day, cold at night, and with the houses generally built on the lowest ground possible, frequently swampy, for convenience of obtaining water. The Sundyaks, by generations of acclimatisation, are pretty well used to it, but nevertheless fever is common, and natural selection of the strong and tough is

always at work amongst them; it is indeed partly due to the constant presence of fever amongst them that their increase in number is so small, the population in fact being almost stationary. On the west coast the Sundyaks (there called Dusuns = villagers) have got the upper hand of the forest, and are gradually felling it and clearing it away before them in an easterly direction. The chief tribes of Dusuns on this east coast are the Tunbunwhas, on the Kina Batangan, Labuk, and Sugut rivers, further inland than the Buludupies, the Tingaras inland of them, the Romanows inland of them again, and the Tingaluns inhabiting the upper waters of the Quarmoto, and the Sibuco. The Tunbunwhas are for the most part fairly civilised, are rapidly becoming converted to Islam, and for the most part wear the Sulu dress; Tingaras retain the manner and dress (or want of it rather) of their Dyak forefathers almost intact; while the Romanows and Tingaluns are little else than wandering savages, at present of a dangerous type, and not unfrequently still indulging in head-hunting.

The Tunbunwhas are the largest and most important of these tribes, and being nearest to the coast, next to the Buludupies, are also the people we have most to deal with. They live a peaceable rural life and have no very particular points of interest about them; it is their custom to move from one place to another on the banks of the river, building a very slight house, clearing the ground, and planting in an idle sort of way paddy, bananas, indian corn, sweet potatoes, and the like; grass sooner or later makes its appearance, very slight attempts are made to keep it down, after a time (generally about three years from first clearing) it has gained the upper hand, and the flimsy house about this time usually showing symptoms of a sudden collapse, a move is made for a fresh location where a similar series of operations takes place. It would seem that these people ought to increase rapidly in numbers, but there are one or two circumstances that strongly interfere with such an increase: one is the vast forest they live in, against which with their lazy ways and the ease with which food and other necessaries of life come to them, they make little headway, and the humid shades and the water they drink, which is necessarily forest-drainage, cause fever to be constant amongst them; another is, they are subject to epidemics, which—living in the small houses they do, men, women, and children, ill and well, all occupying a space not bigger than one room in an ordinary English house, and having no ideas of hygiene or of isolating a sick person whatever illness he may be suffering from — commit frightful ravages amongst them. About ten years ago the Tunbunwhas were getting to be quite a numerous people, the forest was beginning to go down before them in earnest, and their fields to spread some distance back from the margin of the river, so that air, light, and warmth came in, and there was some chance of the river running through clear ground and not through piles of rotting leaves in the forest shade; but the small-

pox came, and I believe that something like nine out of ten died of it, and the forest closed up over the fields again. Intertribal wars, feuds between one chief or village and another, and raids by head-hunting savages down the rivers from the south have always brought about a slight drain on the population, but nothing in comparison with the two main causes I have mentioned, and when once the people have been properly vaccinated, and one or two tracks made from military stations on one coast to the other, no very difficult or expensive matter, so that small feuds can be prevented, a rapid increase of population may be expected. No one will be more pleased than the natives themselves at thus being controlled, and the only matter seriously to be feared in future will be cholera, not half so terrible or loathsome a scourge, however, as small-pox amongst an unvaccinated community.

Head-hunting occurs amongst these people, but can hardly be spoken of as a regular custom; in their intertribal or village fights, the heads of the slain are usually carried off as trophies, and there are head-dances around them sometimes, but the skulls are not usually kept. Towards the west coast, however, head-hunting is much more of an institution, and there are still head-houses garnished with the trophies of former victories. It is towards the southward, however, towards Bulungan, that head-hunting flourishes in full vigour. In former times the country round the Sibuco river used to be well populated, but so constant were the attacks of head-hunters, that chiefly owing to them that district was depopulated.

"Summing-up" (a custom even more revolting than head-hunting) used to prevail amongst the Eriaans (Sundyaks) far down towards the mouths of the rivers; it was the sacrifice of slaves or captives, usually on the death of a chief or other leading personage. On the Kina Batangan the victim was tied up and danced round by the assembled villagers, each with a spear in his hand; after a short time each one thrust his spear a short way, an inch or thereabouts, into the unfortunate's body. The custom of the Bulungan people was for as many as possible to take hold of a spear, and, all thrusting together, to stick it through the victim's body. All these customs are looked upon with great horror by the sea tribes.

The more remarkable animals of the forest are the elephant, rhinoceros, and orang-utan, besides buffalo, deer, pigs, and bear, the clouded tiger (*Felis macrocelis*), the marbled cat (*Leopardus marmoratus*), some twenty different sorts of monkeys, of which the curious long-nosed monkey (*S. nasalis*) is perhaps the most remarkable; many insectivora, both arboreal and ground species, including the gymnena (*G. Rafflesii*), squirrels, animals of the stoat tribe, civets, binterrongs, and very many others too numerous to mention.

The elephant and rhinoceros are confined to the Sandakan and Darvel Bay districts, most of the other parts of Borneo having been at one time

or another cleared and populated, while in the vast continuous primeval forest of the above districts they have roamed undisturbed by sound of axe or trace of man from time immemorial. The orang-utan is more usually found in the same districts than in any other parts of Sabah. The largest orang-utan I have ever seen, measured 4 feet 4 inches; the height of these creatures is very deceptive, as when seen, even if close to, the impression left on one's mind is that they are very much taller.

On the Sulu Islands naturally the larger animals are not found; it is rather curious, however, that on the island of Sugh, there is a spotted deer, which is not, that I am aware, found in Borneo.

Ice in the Spitzbergen and Barents Seas in 1882.

During the past season the state of the ice in the Spitzbergen and Barents seas has been singularly unfavourable to exploration, and the purely geographical results of the year in this part of the Polar basin are consequently almost nil. It is therefore specially interesting to compare the experiences of the Norwegian walrus-hunters, which have been recently published in Norway, with those already communicated from other sources. Captain G. A. Sörensen, of the jagt *Aurora*, sailed to the west side of Spitzbergen in May without any hindrance from ice, but found it impossible to reach the usual hunting-grounds to the northward of the group. He therefore sailed southward again to Stor Fiord, where he remained during the months of July, August, and September, being unable to get to the eastward of Stans Foreland. In the first week of October, he followed the western edge of the ice to Bear Island, without finding any opening to the eastward. The *Aurora* paid a visit to Bel Sound, where it was found that the heavy snow which fell in the beginning of September had almost disappeared, the rivers being consequently much swollen. Judging from the strips of seaweed and small stones which were visible above high-water mark, Sörensen considers that the west coast of Spitzbergen must have been kept open during the winter of 1881–82, the south-westerly and westerly gales which prevailed during that time having driven the ice to the northward, and packed it towards and beyond North-East Land. The north-easterly winds which prevailed during the spring of 1882 appear to have driven the ice back again on both sides of Spitzbergen, leaving a tolerably broad open channel along the south side of that group and Franz-Josef Land. In ordinary years Stor Fiord is covered with what the walrus-hunters call "fast ice," or fiord ice with a tolerably smooth surface; but last season Sörensen found it, for the first time in his long experience, to be blocked, especially on the east side, with heavy broken

masses of floe ice which came in from the eastward. Nils Johnsen, of the jagt *Berentine*, was also in Stor Fiord during June and July, and then attempted to reach the northern hunting-grounds, working backwards and forwards with the ice in the neighbourhood of Amsterdam Island from the 9th of August to the 8th of October. The *Berentine* did not, however, succeed in getting even so far east as Moffen Island, and Johnsen agrees with Captain Palander in thinking it unlikely that Mossel Bay could have been reached later on.

J. N. Isaksen, of the jagt *Pröven*, sailed in April for Novaya Zemlya, and sailed backwards and forwards along the edge of the ice during June between lat. 69° 25′ and 73° 20′, long. 49° 30′ to 40°, without being able to reach the land. The ice was only from one to two feet thick, with a generally level surface, and Isaksen considers that this smooth thin ice along the west coast of Novaya Zemlya was formed by a heavy snowfall in March and April, and that before that time there was open water. His opinion was strengthened by finding the land still covered with snow when he reached Matyushin Strait on the 12th of July. The strait then appeared to be entirely free from ice, and outside the land ice there was open water up to Admiralty Peninsula, which was reached on the 15th. Isaksen then sailed northward until he was about 30 miles to the westward of Berg Island, when he found a heavy pack extending to the north-eastward, and closing rapidly into the land. By the evening of the 20th the ice had almost reached the coast, and on the 27th the *Pröven* passed within four miles of Suchoi Nos. Off the entrance to Matyushin Strait there was a large opening in the ice to the westward, which enabled Isaksen to reach open water on the 28th of July in lat. 73° 5′, long. 48°. He returned to Tromsö on the 6th of August.

Sören Johannesen, of the schooner *Andenæs*, sailed from Tromsö on the 10th of July for Jugor Strait, with materials for a storehouse which Sibiriakoff intended to erect there. In the middle of August a strong north-westerly wind drove the ice to the southward, and the *Andenæs* was able to approach the Kara Strait, but Waigatz Island could neither be reached nor seen. Johannesen then sailed to the westward until he reached the edge of the ice, which was driving fast to the eastward, in long. 53°. He then followed it to the southward, and on the 23rd of August reached the small island Motjewewo. The ice then began to drift to the westward, and the *Andenæs* anchored at the north end of Meschdurscharskij. Neither of these names appears on our charts. Here she remained until the 28th of August, when, as there seemed to be no chance of reaching Jugor Strait, and as Johannesen had strict orders not to risk being frozen in, he decided to return to Norway.

Hans Johannesen, of the steamer *Nordenskiöld*, which was also bound to Jugor Strait, attempted to get to the eastward on the 23rd of August, and succeeded in sighting Waigatz Island. The *Nordenskiöld* made several unsuccessful attempts to reach Jugor Strait after the *Andenæs*

had sailed for home, and was then obliged to return without fulfilling the objects of her voyage.

From a comparison of these reports with those which we have already published, it is evident that the ice-conditions of 1882 differed widely from those of the previous year. In the spring, and far into the summer, of 1881, the ice was exceptionally low down towards the coast of Norway, while there was open water north of Spitzbergen and Novaya Zemlya. In 1881 also the ice disappeared with extraordinary rapidity when it once fairly began to melt, while in 1882 it seems hardly to have given away at all. The north side of Spitzbergen has also been almost inaccessible, which is not known to have been the case for many years. The most probable explanation seems to be that the northerly winds which prevailed during the spring and summer kept up a steady supply of ice from the northward, sufficient to keep pace with the melting of the pack at its southern edge. But it is almost certain that to maintain this supply large tracts of water must have been left open in some other part of the Polar basin, and it is therefore possible that the past season would have been very favourable to an expedition starting from Behring Strait. Its effect on the prospects of a regular trade with Siberia is sufficiently interesting and important to be discussed separately, and we propose to do this in our next number.

GEOGRAPHICAL NOTES.

Mr. Leigh Smith, as a mark of his gratitude for the interest shown by the Society in the fate of himself and the crew of the *Eira* during their late voyage to Franz-Josef Land, has made a donation to the Society's funds of 1000*l.*, to be applied in defraying expenses of expeditions.

Mr. A. P. Maudslay left England on the 13th of January, on his third journey to Guatemala, where he intends to make a more thorough study than before of the Indian ruins he described in his paper read to the Society on the 11th of December last. He travels viâ New York.

Dr. Lansdell's Journey in Central Western Asia.—The Rev. Henry Lansdell, D.D., the well-known Siberian traveller, who left England in June last on a second long journey, has recently returned, having accomplished in the interim a journey of upwards of 11,000 miles through Western Siberia and Turkistan. He followed the route of his former journey as far as Tobolsk, then ascended the Irtish to Omsk, and passed on to Kuldja, Vernoe, Tashkend, Khokand, and Samarcand. He crossed by a mountain-path into Bokhara at Shehr-i-sabz, where he was received as a guest by the Emir, and then continued to Karshi, Bokhara, and Charjui on the Oxus, from which last-mentioned place he descended

by river to Khiva. Under the Khan's protection he proceeded northwards to Kunya-Urgenj, whence he turned westwards across the Turkoman desert, by the old bed of the Oxus and Sary-Kamish, to Krasnovodsk; he crossed the Caspian to Baku, returning to Europe by Tiflis, Batoum, and Odessa.

Mr. Joseph Thomson embarked at Suez, in the *Arcot*, on the 11th of January, for Aden and Zanzibar, after a short stay in Egypt. He visited Dr. Schweinfurth in Cairo, and obtained some information regarding the journey across Africa of Lieutenant Wissmann, who was detained in Egypt, on his way home, by a slight attack of fever. From Nyangwé, Lieutenant Wissmann had travelled to Tanganyika and Ujiji by the usual caravan route, visiting the Lukuga outlet on his way, which he found nearly in the same condition as when Mr. Thomson saw it. He says that the Lake Lincoln, reported by Dr. Livingstone, does not exist. Between Ujiji and the residence of king Mirambo (of whom he speaks very favourably) he had a narrow escape of his life in a village brawl, which arose among the natives during his stay.—According to a letter from Mr. Wakefield, received within the last few days, the neighbourhood of the mission station of Ribé, near Mombas, has recently been visited by a marauding party of Wakwafi, a tribe through whose territory Mr. Thomson will have to pass on his expedition, and who are said to be a section of the redoubtable Masai nation. The raiders made their first appearance near the settlement on the 25th of October, and hovered about for a day or two without venturing to attack the place. Their object seems to have been cattle-stealing. Mr. Wakefield watched them most of the time. They approached with great wariness and hesitation, almost creeping under the shelter of their long shields, and keeping to the side of the village where there were trees and bushes, apparently afraid of the stone houses. The natives on watch in the settlement wanted to shoot them, which they could have done very easily; but Mr. Wakefield ordered them not to fire, knowing the bad effect which any bloodshed might have on the prospects of Mr. Thomson's expedition. The danger of a collision, however, was only averted with difficulty, for two of the marauders approached one of the houses very closely, and shouted a challenge with their spears. The party eventually retreated precipitately, showing the greatest cowardice on shots being fired at them by a neighbouring farmer.

Journey of a Native Indian Explorer through Tibet. — One of General Walker's native explorers has just returned to India after an absence of four years, during which he has obtained a large amount of new geographical information, and finally disposed of the question of the Sanpo river. He had travelled on a former occasion with one of the celebrated pundits, and was trained by him for this expedition. He left India in March 1878 with two companions, C—— and D——, proceeding

from Darjiling to Lhassa viâ Phari, intending to equip himself there for a journey towards Lob Nor, which place Prejevalsky had not then reached. At Lhassa he was detained for some time. At length he joined a caravan proceeding to Mongolia, and accompanied it to a place called Thingali, on the road to Sinning (roughly in lat. 36° by long. 96°) which was reached in December 1879. Here the caravan was attacked by a band of robbers, and they were plundered of most of their property, the traveller's stock-in-trade being reduced to about a tenth of what it had been, but he saved his instruments. He then started north-westwards towards Lob Nor, and although detained two and a half months at a place called Gobi, managed to push onwards to Saithang (lat. 39°, long. 92°). Here one of his companions deserted him, after robbing him and his other assistant extensively, and he and his remaining companion thereupon took service with the Mongolians, whom they accompanied to Saitu (lat. 40°, long. 92°), the northernmost point which they reached, and which is possibly identical with Marco Polo's Sachiu. There they entered the service of a friendly Lama, with whom they travelled back to Saithang, and then south-east to Barong Chaidam (lat. 36° 30′, long. 97°), and afterwards south to Thuden Gompa, where they took service with a Chinese Tartar, and accompanied him to Ta-tsien-lu, where they reported themselves last February to the Jesuit mission. The mission bishop sent immediate information to General Walker of their arrival, which was most welcome, as a few months before Nain Sing had been informed that the traveller had had his legs broken to prevent him from making further explorations, and that his companion D—— had been executed by the authorities at Lhassa. Thence they proceeded to Batang, and after some stay endeavoured to reach Assam by the direct route. They proceeded as far as Rima and Sama (*sic*), on the frontier of the Mishmi country, where they were told that it would be impossible to reach Assam by the direct route, as the Mishmis were savages, who would murder them; they therefore took the circuitous route to Lhassa viâ Alauto and Gjamda, and having reached the latter place they turned down to Chetang on the Sanpo, avoiding Lhassa for fear of being recognised. From Chetang they travelled viâ Giangze Long and Phari to Darjiling, where they arrived last month. The traveller has managed to save all his journals and his instruments, and bring them back with him. He has taken a large number of observations for latitude, and kept up a more or less continuous traverse of his route. It will take some months to plot his work and draw up a report of it, and General Walker regrets that he no longer has a Montgomerie to aid him in the task.—The traveller says that Sama, on the Mishmi frontier, is the place where two Europeans coming from Assam were murdered some thirty years ago. Thus Sama must be identical with Wilcox's Simé, where the priests Krick and Boury were murdered in 1854; and the remark by Colonel Yule, at p. 381 of vol. xxx. of the 'Journal of the Asiatic Society of Bengal,' that "this murder of

two missionaries becomes thus in fact the basis of a geographical connection between British India and Thibet," is even more appropriate now than it was originally. If the Sanpo river passes into the Irawadi, the native explorer must have crossed it between Batang and Sama, between Sama and Gjamda, and again at Chetang; but he is positive that he only crossed the Sanpo once, at Chetang, and that on the road from Sama to Gjamda there is a great range of hills to the west, separating the basin of the affluents of the Sanpo from that of the affluents of the river to the east. One of the latter may possibly fall into the Irawadi, but the Sanpo assuredly cannot do so. General Walker is much pleased with his traveller's performance, and his steady perseverance with his work after he had been robbed of all his money, and was compelled to take service in order to earn a livelihood.

The Tin-producing District of South-east Queensland.—Mr. Robert L. Jack, Queensland Government Geologist, who was engaged in July last upon an inspection of the Stanthorpe Tin Mining District, on the Queensland and New South Wales frontier, has made a preliminary Report, from which the following points are taken:—His journeys extended from Maryland south-westward to the Red Rock, a distance of about 30 miles, within which limit he visited most of the stream tin-workings, and also traversed the greater part of the range between Maryland and the heads of Sugarloaf Creek. The district consists, at least as far south as Ballandean, mainly of granite, presenting the usual features observed in a region of that nature, and forming a table-land at an average elevation of little less than 3000 feet above the sea-level. The high grounds rise in soft undulations, where the granite is decomposed to a considerable depth, with an occasional "tor" or mass of huge undecomposed blocks, with their asperities rounded off, standing up isolated in such a manner as to suggest carriage from a distance by glacial action. The summit of the range dividing South-east Queensland and New South Wales presents a chain of these "tors," often continuous for some distance, but with frequent gaps where the rock has been disintegrated, through which the range may be crossed almost imperceptibly in many places. The heads of the streams draining this country are shallow and swampy, and when they attain any magnitude they find it easy to wander among the soft decomposing surface of the lower granite region. Thus the Dumeresq, or Severn, and its tributaries have exceedingly tortuous courses and deep alluvial deposits. The tin-producing area appears to be nearly coincident with that occupied by the granite, and by far the greater part of the ore is in fine grains, not exceeding the size of an ordinary pin's-head, and generally forming with quartz granules and pebbles the matrix of a coarsely-cemented conglomerate, lying directly on the bed rock, surmounted by a varying thickness of sand. Mr. Jack's more minute observations lead to the conclusion that the tin-stone was originally in the form of mostly small

crystals, concentrated by the weathering of its original matrix during a long period of gentle sub-aerial denudation, when the rains were never sufficiently heavy to remove it, and finally deposited in the upper reaches of the Severn and its tributaries by a limited period of heavy rainfall or possibly of melted snow, sufficient to sluice the hill-country and carry the finer particles to the south-west plains. Two distinct types of tin-bearing rocks were met with, quartz reefs and volcanic dykes, the latter of which are to be found at various points in the range on the boundary, though there is no reason to doubt that they are common to the whole of the country specified, as they run at varying angles coinciding with the system that characterises the granite. On the exhaustion of the alluvial deposits, the prosperity of the district will depend upon these erupted rocks, in Mr. Jack's opinion; and, passing over his technical arguments, it may be observed that a minute topographical examination of the country is recommended in order to discover localities in which stanniferous dykes occur, as they will in all probability also be found in the slate and greywacke country near the granite.

REPORT OF THE EVENING MEETINGS, SESSION 1882–3.

Fourth Meeting, 15th January, 1883.—The Right Hon. Lord Aberdare, President, in the Chair.

Presentation.—*Rev. E. F. Taylor.*

Elections.—*Major George Barker*, R.E.; *Joseph Bevan, Esq.; Edwin Charles Davis, Esq.; Cecil Henry Harper, Esq.; Thomas Sharp Hudson, Esq.; Rev. William Henry Penney; Colonel C. F. Roberts (Commanding N.S.W. Artillery); Thomas Alfred Routh, Esq.; Philip Winser, Esq.*

The paper read was:—

"On the Various Means of Communication between Central Persia and the Sea." By Colonel J. U. Bateman Champain, R.E.

Will be published, with discussion and map, in the March number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—January 5th, 1883: M. Victor Guerin in the Chair.—Announcement was made of the return of Colonel Perrier (of the Institute), Vice-President of the Society, who was sent to observe the transit of Venus from the coasts of Florida.—M. William Huber, Vice-President of the Central Commission, then announced, 1st, the opening of a subscription, organised by the Geographical Society of the East at Nancy, to erect a bust to Dr. Crevaux; (subscriptions can be paid at the offices of the Geographical Society of Paris); 2nd, the completion of the monument erected to the Flatters Mission at Montsouris; 3rd, the proposal of the Government of the United States to summon an International Congress, to consider the adoption of one common meridian.—The last 4 sheets published of the map of Tunis, scale 1:200,000 (provisional edition) were received

from the Minister of War, and, in addition, one copy of 'L'instruction relative aux levés en campagne," issued by the present Government.—The Minister of Naval and Colonial Affairs sent the first sheet of the map of New Caledonia, prepared by Colonel Bagay, which will comprise 5 sheets; also 85 photographic views (which were exhibited in the hall) taken at Senegal by Dr. Bayol's mission.—M. Alph. Milne-Edwards sent a letter on the scientific campaign of the ship *Le Travailleur* in 1882. The letter will be inserted *in extenso* in the report of the Meetings.—Translations were received from Abbé Desgodins (i.) of a pamphlet by Mr. Lepper on 'The Question of an Overland Route from India to China viâ Assam,' (ii.) of an article by an Englishman of Calcutta, dated 13th June, 1882, upon 'Trade Routes from India to Thibet and China,' the article is signed A. D.—M. E. Milhôme, a French settler in the province of Tarija (Bolivia), wrote from Carapari in October 1882, that he was convinced beyond a doubt that some of those who formed part of the Crevaux Mission were still alive and dwelling as slaves among the Tobas; that he had spoken to a youth, named Fr. Zeballo or Zeballos, who has been already mentioned as having escaped the massacre. This Zeballos had seen one of the prisoners, a man named Blanco, with whom he had conversed; the Indians had fastened Blanco to a tree, and treated him like a dog. A cacique, whom M. Milhôme had sent (having promised him a reward) to obtain information at Tejo on the banks of the Pilcomayo—the neighbourhood in which the massacre had taken place, and where the Tobas congregate in winter—had returned, confirming the news of the detention of the white men as prisoners by the Indians, who were being instructed by them in the use of arms. On the motion of the General Secretary, the Society decided that a copy of this letter should be sent to the Minister of Foreign Affairs, in order that the necessary measures might be taken to ascertain the truth of the matter.—A letter dated 11th November was received, through the Minister of Foreign Affairs, from M. Ledoulx, French consul at Zanzibar, informing the Society that Dr. Fischer, who has been preparing himself for his journey by a long course of study, had left Zanzibar for the interior. He had spent five years at Zanzibar, studying the languages of the country and forming useful connections. It is his intention to visit the unfriendly tribe of the Masai; from there he will reach Kilimanjaro in order to explore the country between the Lakes Manyara and Naïvasha. Further that the German lieutenant Wissmann, who started from St. Paul de Loanda two years ago in company with Dr. Pogge (the latter has since returned to the coast), had arrived at Tabora, and was expected to be at Bagamoyo in November. He will then have accomplished a journey across Africa from west to east. The consul goes on to describe the interest which is taken in the operations of the missions sent out by the German Committee of the International African Association, which was charged to establish a station at Kokoma, between Tabora and Karema. But it has also collected important natural history specimens, and obtained some highly interesting ethnographical information.—Captain Bloyet, French observer in Usagara, the triangulation of which he is at the present moment making, was stated to have sent to Zanzibar some cases containing various collections, and these are to be forwarded on to France.—It was announced that the Pères du St. Esprit were about to establish a new post in the interior, and that the Missionnaires de Notre Dame d'Afrique were erecting a house at Zanzibar to follow the advances of the missions across the "dark continent."—It was further stated that M. Giraud, qualified midshipman of the French navy, not having yet received the vessel which he had ordered in England, had not left Zanzibar, where he was studying the native idioms before starting for the interior of Africa, which he should have done by the end of December; also that a chronometer, the gift of the French Government, had been sent to Mr. Hore, the English missionary, in consideration of the great care and

attention shown by him (Mr. Hore) to the late Abbé Debaize.—From a letter of the chief French consul at Shanghai, who has had a conversation with M. James Morrison, the English engineer, it appears that the Yellow River has not, as might have been expected, resumed its southern course, but that it only flows with recurring floods in its old bed; the Hoang-ho continues to discharge its waters into the Gulf of Pechili, and the ancient bed of the river does not appear to have undergone any modifications.—M. Martin la Meslée, attaché of the Surveyor-General's office at Sydney, writes from that town, that he is engaged in re-establishing the Geographical Section, which formerly existed in the "Royal Society of Sydney," and that with the assistance of several persons who are taking an interest in geography, he hopes to succeed. He informs us, moreover, that there is no more doubt regarding the relics and papers of the traveller Leichhardt, about which there has recently been so much discussion, for they have been recovered; and this discovery will, it seems, prove to be positively authentic.—M. Brau de St. Pol Lias intimated the return of M. de la Croix to France, who had set out upon a second voyage to the Malacca Peninsula. He (M. de la Croix) has again ascended the Perak river and also one of its affluents, the Quinta, as far as the valley of Lahat. The engineer by whom he was accompanied was struck with the mineral wealth of the country. —One of the members having announced that the remains of M. Bounat, a French traveller who died on the African coast on the 8th of July, 1881, had just been brought back to France, M. de Brazza, who was present at the meeting, reminded the Society of the merits of this explorer; then, referring to his own expedition to the Congo, he stated that six days after the vote of the French Chambers he had despatched an advance convoy, and that he himself would follow shortly, as soon as his preparations were completed.—M. Joseph Martin, mining engineer, writes from Eastern Siberia that having set out from Irkutsk, he was stopped by the ice-floes which the Lena drifts in large quantities. As far as the district of Yakutsk, where he is now situated, he has observed 120 altitudes by the barometer, and fifteen by the hypsometer; the two Russian maps which he uses, are, he says, full of errors. He hopes to be able very shortly to reach the watershed north of the Stanovoi Mountains.—Colonel (now General) Venukoff, who has just been apppointed foreign correspondent, sent two letters; one relative to the travels of M. Lessar in 1882,* the other having reference to two new meteorological stations, established in the north of Russia at Mesena (Europe) and at Berezov (Asia) respectively. The situation of these two posts on the west and east of the Ural Mountains, and away from the action of the Gulf Stream and its ramifications, gives them a peculiar importance. From there come in fact, says our correspondent, those cold, dry winds which from time to time sweep over the surface of Europe, extending as far as the banks of the Rhine, and even further to the west.—The Society of Historical Studies gave notice that it had opened a competition with a prize of 1000 francs, to be awarded in 1884, upon the following question: "The effects, from an economist's point of view, of the cutting of the Isthmus of Panama on the relations of Europe with the countries washed by the Pacific Ocean (Western America, Oceania, Eastern Asia).—The inventors, makers, and patentees of a vehicle, called "Voiture d'Exploration," which is intended for the use of travellers in distant lands, submitted their invention to the Society. This vehicle is made of iron throughout; it is water-tight, and can be taken to pieces; if necessary it can be made into a boat; when travelling on very difficult roads it is taken to pieces and these are carried by a mule.—In conclusion, a short extract was read by M. F. Fernandez on the recent progress of the Argentine Republic.†

* See R. G. S. 'Proceedings,' 1883, No. 1, p. 1 *et seq.*

† To be published in the quarterly Bulletin of the Society.

——— January 19th, 1883: Dr. Hamy, Vice-President, in the Chair.—The Chairman announced the reconstitution of the Bureau for 1883, which had just taken place. The following had been elected:—President of the Central Commission, M. Antoine d'Abbadie (of the Institute); Vice-Presidents, MM. Bouquet de la Grye and Dr. Hamy; General Secretary, M. Maunoir, who retains the duties which he has for so many years discharged so efficiently; he will be assisted by MM. J. Girard and Jaquier, Secretaries.—In the absence of MM. d'Abbadie and Bouquet de la Grye, who had not returned, the former from the Antilles and the latter from Mexico, where they had gone to observe the transit of Venus, M. le Dr. Hamy opened the 63rd Session of the Geographical Society of Paris.—Madame Francis Garnier intimated that a subscription had just been opened at Saigon (Cochin China) to erect a bust to the memory of her late husband.—It was stated that the remains of M. J. Bounat, the French traveller in Africa, who died on the 8th July, 1881, at Taquah, had been brought back to France, as announced at the last meeting, and that they had been interred at Pont-de-Vaux. M. Verillon, as representative of the Society, had delivered an oration, of which he gave notice, over the grave. *A propos* of this, a correction should be made in the report of the last meeting. M. Bounat, who died at the age of 35 (not 42), has left a sum of money to establish a mission among the Ashantis, not at Dahomey (as stated).—The French legation at Buenos Ayres transmitted a report of M. G. Marguin, with two maps of that part of the Pilcomayo which has been explored by the Argentine expedition sent in search of the remains of Crevaux. M. Marguin formed part of that expedition. His account furnishes us with the first information which has been obtained as to the course of this river. The report and maps are to be published in the fortnightly *Bulletin*.—M. Paul Soleillet wrote from Ankober (Shoa, South Abyssinia) on 10th November, 1882, that he was going to start in a few days for Kaffa, where he will remain about two months; that he had met Dr. Stecker, who should also be at Kaffa. The king has, it appears, made large concessions to the Company which M. Soleillet represents. He (M. Soleillet) speaks especially of the immense forests of olive-trees which exist there; if they were grafted, they would rival those of Kabylia. The Company will have, for twenty-five years, half the proceeds of the harvest.—Several items of information regarding Russian travellers were received from Colonel (now Major-General) Venukoff. He states that Mdlle. Gutcharoff, who is following in the footsteps of Mesdames Wassilieff and Fedchenko, is to accompany Dr. Junker, now preparing to start for Central Africa; that M. Poliakoff has returned from the island of Sakhalin, bringing with him important geological and anthropological collections. He (M. Poliakoff) has ascertained that Russian colonisation is making rapid progress there.—M. Yavorski is now publishing the account of his journey to Cabul (1878–9), which General Venukoff believes will afford much interest to geographers. An extract sent by him from this account, says that the once famous town of Bamian, in the Hindu Kush, exists only in ruins, a citadel being all that remains.—M. Strauch, Secretary of the International African Association at Brussels, sent a *résumé* of the contents of the last letters received from MM. Storms and Becker. From this it appears that M. Storms arrived at Karema on the 27th September, 1882, having left the coast on the 9th June; thus he had only taken three months and a half to make this journey — an unparalleled feat. The black population is developing rapidly in the place; as many as fifty families can be counted, each dwelling in a separate hut. M. Becker has opened up new roads to facilitate the clearing; but he was going to return to Europe shortly, only temporarily however, for he will ask permission to return to the country, where he has, to use his own words, "lived happily among the people he has been able to rescue from slavery."—The Society was informed of the recent departure of the new papal vicar of Central Africa, Monseigneur

Fr. Sogaro, who has just set sail for Egypt, whence he will reach Khartum and the Upper Nile. The countries entrusted to his care and that of his missionaries are immense and for the most part unexplored; they comprise that vast region of Central Africa lying between the Sahara on the north and the Equator on the south, and bounded on the east by the Nile and on the west by the Niger.—The report of the meeting of the Italian Geographical Society at Rome, held 6th January, was read. It was at this meeting that M. Bove, naval lieutenant, made a statement upon his recent expedition to South Patagonia and Tierra del Fuego. This report is taken from the journal *L'Italie* of the 10th January. The object of the expedition was not, as has been affirmed, the exploration of the Antarctic regions, but simply of South Patagonia and Tierra del Fuego (the hydrography and physical conditions of which were scarcely known) and also of the Antarctic seas.—M. William Huber laid on the table a set of new surveys, which have been made recently by the West Switzerland and Simplon Railway Company, with reference to the new cutting of the Alps by way of the Simplon. These surveys have been considered necessary in order to answer various objections raised against the rough draft-scheme of 1878, especially regarding the very steep declivities on the Italian side. These surveys have special reference to Mont Blanc. M. Huber gave a rapid analysis of the documents presented by the company.—M. J. Jackson, librarian and record keeper of the society, read a report upon the state of the library in the year 1882. He stated that the following additions had been made:—1049 works, comprising 1542 volumes (exclusive of 412 periodicals), 170 maps in 609 sheets, and 25 atlases. The society has now in its possession 600 portraits of geographers and of French and foreign travellers.—M. Chervin offered some observations upon the last census of the French population, as compared with that of other States; and M. Chancourtois remarked briefly on the recent circular issued by the United States concerning the adoption of a common initial meridian and of a universal hour.—M. Ch. Gauthiot, General Secretary of the Commercial Geographical Society of Paris, gave some information of the German lieutenant Wissmann, who has just accomplished a journey across the African continent from west to east, or in an opposite direction to his predecessors (Serpa Pinto excepted). He started in January 1881, and arrived on the east coast on the 17th November, 1882. He has traversed one of the least-known countries in the interior of Africa; the country, he says, is densely populated. His travels have extended over 3600 kilometres, of which one-third was in unknown territory. This exploration, which has been conducted with such energy and skill, will prove, says M. Gauthiot, most profitable to science.—M. L'Abbé Guyot, the newly-arrived missionary from Africa, entertained the Society with an account of two journeys made by him in this region. In 1879 he had been commissioned to conduct a convoy of Algerian missionaries to the Great Lakes. According to M. Guyot, fever is the most dreaded enemy of the newcomer; the climate is too enervating, and may be compared to a leaden weight upon one's shoulders. Of thirty-five missionaries who have set out in two or three years to evangelise, sixteen have succumbed to the fatal attacks of fever, and four have been massacred by the negroes. On his return from his second journey, Père Guyot, having been left to choose his route, determined to ascertain whether the Luaha, Ruaha, or Lufigi, the great river which issues from the Great Lakes and discharges itself into the sea below Zanzibar, was navigable. He is now preparing a map of the country which he has gone over. He sailed along the Kizigo, a tributary of the Ruaha from the southern bank, and still unknown, which divides Ugogo from the country of the Wahehe and Mafiti, who are great warriors, and robbers. From there he entered a country entirely desert, where, however, he says he made some interesting observations. The result of this excursion, which lasted seventy-two

days, is that the Ruaha is not navigable; it is a very beautiful, broad watercourse, and, while in some parts it is extremely narrow, in others its bed is dotted over with verdant islets, which are charming to the eye, but impede navigation to a large extent; moreover, rocks, heaped together by storms, offer an almost insurmountable obstacle to navigation. The Ruaha, in common with nearly all the rivers of this part of Africa, teems with hippopotami and crocodiles. The traveller remarks that wherever the hippopotamus is found, the crocodile thrives there also. Père Guyot is going to start very shortly for the Congo; passing by Stanley Pool, he will explore the unknown regions which extend beyond this point, and will advance as far as he possibly can.—In conclusion, M. H. Tarry offered some remarks upon the Mzab Territory, which has just been annexed to the French Algerian possessions. He described the country and the manners of its inhabitants, and intimated that the French Alpine Club were already organising an excursion to Mzab, which is to take place shortly.

Geographical Society of Stockholm. — November 17th, 1882: Professor Aug. Fries, President, in the Chair.—At the commencement of the meeting the President exhibited and explained the objects from the Fiji Islands presented by Consul Kopsen, as well as some assegais presented by King Cetewayo.—The next speaker was Baron G. de Geer, the leader of the geological expedition despatched last summer by the Swedish Academy of Sciences to Spitzbergen, who delivered an address on the geography of Spitzbergen. Although the object of the expedition had been to study the geological features of the islands, many observations tending to throw light on their general geography had also been made, and the speaker exhibited two maps made by two previous expeditions which had been carefully corrected by the last one. The first of these showed the shape of the fjords and valleys of South Spitzbergen, and the estimated extension of the inland ice, and the second the depth of the sea around Spitzbergen and Scandinavia. The speaker pointed out that these two countries, as well as the intervening Beeren Island, were ridges on a comparatively level plateau, bounded a little west of the same by the deep ocean; he also gave a description of the area and form of Spitzbergen, as well as the geological formation of the island in relation to the topographical. Of special geographical interest also was the close relation between the deep and numerous fjords and the valleys, which the speaker believed with Prof. Nordenskjöld were not due to upheavals, nor to running water, but to glaciers. And from the marks found on the rocks of Beeren Island, it might be supposed that the inland ice of Spitzbergen had extended thus far during the glacial period. This period was followed by a sinking of the land both in Spitzbergen and Scandinavia; but at a later date it had again risen above the plateau before mentioned, with the appearance it now presents. It was impossible to explain otherwise how the flora and fauna of Scandinavia had found their way to this island, nearly 700 miles from the continent. He considered that at the end of the glacial period the Gulf Stream flowed in a more northerly direction than at present, thus explaining the pre-historic mild climate of the island. Baron de Geer concluded his address by showing some remains of a Russian cabin found at Eckman Bay, which he believed to be about a hundred years old.—The last to address the meeting was Dr. Montelius, who spoke on the bronze period in Asia. He believed that bronze had not been introduced into Europe by way of the Caucasus, but through Asia Minor to Southern Europe, and hence to the North.

Geographical Society of Copenhagen.—December 5th, 1882: M. Larsen gave an account of his journey last winter through Siberia with the *Jeannette* Search Expedition. He stated that, as recently as ten years ago, our general knowledge of

Siberia was confined to the great watercourses, but that much information had been gained by the late expeditions into the country, and not the least by the expedition in question. He had participated in it as the special artist of the *Illustrated London News*. The route was viâ Orenburg by sleighs to Omsk. One night, while blocked by the snow, the party had been attacked by wolves, which however dispersed when fired at. The speaker did not believe in the statements as to the number of wolves in Siberia. They often met Kirghiz traders riding on camels, and had once visited one of their camps, where they were received by the chiefs with great courtesy. There was a regular school there, where children from three to five years were taught reading. From Omsk the journey was continued to Irkutsk, the capital of Siberia, an elegant and flourishing city, and further along the Lena to Yakutsk, and hence to Verkajansk, a place which holds the position of having the lowest average temperature on the earth. At the latter place they met Mr. Melville, of the *Jeannette*, with the body of De Long. M. Larsen gave an account of the finding and position of the bodies of the crew, whose deaths must have been very painful, judging from appearances. In his opinion, Mr. De Long and his party would have been alive if they had taken with them shot guns instead of rifles, as ptarmigans were plentiful in the delta. Had he arrived there two days earlier, he would also have met some natives. The speaker, in conclusion, said that after having relieved the search-party under Lieutenant Berry, which had been without fresh meat or fish for two months, the expedition returned to Yakutsk in the spring after a very laborious journey.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Helmersen, G. von.—Geologische und physico-geographische Beobachtungen im Olonezer Bergrevier. St. Petersburg (Buchdruckerei der k. Akademie der Wissenschaften): 1882, 8vo., pp. 412, map, and atlas of plates. Price 10*s*.

A separate publication of vol. v. of the second series of the well-known 'Beiträge zur Kenntniss des Russischen Reiches und der angrenzenden Länder Asien's,' formerly edited by Baer and Helmersen, and now by Helmersen and L. von Schrenck. The author originally conducted personal researches in the mountain region of the Olonetz Government (south of Archangel and east of Finland, containing Lake Onega) some twenty-two years ago, and published a sketch of the results in vol. iii. of the 'Memoirs' of the St. Petersburg Academy of Sciences. He now elaborates the subject, incorporating the information subsequently obtained by the travels of other scientific men, whom he enumerates, giving also a brief chronological account of the attempts at iron-working in the district since the seventeenth century. As regards economic minerals, he disbelieves in the old and unsubstantiated account of gold occurring in Olonetz, and states that, although ironstone is found in certain places, it is not workable to a profit, though bog-ore is more plentiful. He also gives a short account of the anthracite deposits, and reproduces in the appendix various old reports on the copper-mines by Von Harrsch. His own observations (mainly of a geological nature) refer to the formations of the different localities visited, and are frequently illustrated by small drawings. Some barometrical tables and depths conclude the work. The map is geological, but there are some rectifications, &c., of the maps of the Olonetz Government at p. 281.

The atlas contains plates of geological objects and views of interesting points (such as the church and house of Peter the Great at the mineral spring of Marzialnya Wody).

Oesterley, [Dr.] Hermann.—Historisch-geographisches Wörterbuch des deutschen Mittelalters. Gotha (Justus Perthes): 1883, sm. 4to., pp. 807, in double column. (*Dulau*: price 1*l.* 1*s.*)

The first part of this elaborate work, by the learned Librarian of Breslau University, was noticed in our 'Proceedings' for 1881, p. 246. His object and plan were fully explained by himself in Petermann's 'Mittheilungen' for that year, p. 194 *et seq.*, and the now completed book can scarcely fail to be of the highest value to all students of the history or geography of the great area covered by the term Germany in and subsequent to the middle ages. An enormous number of names (some 48,000) is given, with a brief definition of the localities to which they refer, when identified, under their modern accepted orthography; followed by a chronologically arranged series of the different renderings of each, and an exact bibliographical reference to the authors quoted for the latter.

Robinson, C. E.—A Royal Warren, or Picturesque Rambles in the Isle of Purbeck. London (The Typographic Etching Company, 23, Farringdon Street): 1882, 4to., pp. xiv. and 186, map, illustrations. Price 1*l.* 10*s.*

To be noticed here for the peculiar attention paid in it to the smaller points of physical geography, and the excellence of the etchings and illustrations of topographical subjects (by Alfred Dawson), to which the process of typographic etching, as explained in the preface, appears to be especially adapted.

ASIA.

Macgregor, [Major-General Sir] C. M.—Wanderings in Balochistan. London [W. H. Allen & Co.): 1882, 8vo., pp. 315 [no Index or table of contents], map in cover, illustrations. Price 18*s.*

After his explorations in Khorasan in 1875, the author started at the end of September in the following year with the late Captain R. B. Lockwood, his object being to examine the nature and military capabilities of the country from Mekran northwards and westwards across the desert of Kharan to the southern Afghanistan boundary, and to return to India across Baluchistan. The area proposed to be explored, though traversed near the coast by the routes of a few British officers, and in two directions in the interior by Pottinger and Christie, is for the most part quite unknown, or only partially and very incorrectly defined; so that the results of the present journey add extensively to geographical as well as professional knowledge, both in topography and the wider physical features, as shown by a comparison of the map accompanying this volume and that of Sir Oliver St. John.

It may be observed that the author's explorations were conducted in the same year as those of Mr. E. A. Floyer, and that they continue that traveller's work towards the east, commencing a little to the east of his furthest eastern point, the two routes in no case overlapping.

Arrived at Jask, the author and his companion went on to Gwadur by sea; and after a discussion of the points on the coast at which it would be possible to disembark a force, he came to the conclusion that only Pusni and the Dasht river were suitable. Captain Lockwood therefore undertook the route from the latter point, and, after visiting the mouth of the river, followed it north-east to Kantadar, and thence to Pidark, from which he struck more or less east to Gwarkop, Thal, and Balor, turning north from the latter point past Nal, and rejoining the author further north at Miri Isai. It should be noted that the names on the map frequently differ materially from those in the text, and that the map shows (probably in error) a route from Balor south to Ormara on the coast, which is referred to in the appendix, but of which no mention appears in the text.

The author, on leaving Captain Lockwood, turned east along the telegraph line on the Mekran coast as far as Pusni, where there is a station, and then struck north to Dokani and north-west to Pidark, turning east again along the Sami valley and north-east by the Balgatar depression (occasionally a lake

basin, judging by its physical formation) to Tash, from which he continued north to Miri Isai in Panjgur. This district appeared to be the limit northwards of any approach to accurate knowledge, and the ranges of hills so far were found to run east and west, the connecting spurs running north and south. Various corrections in the received topography of the Panjgur region will be found at p. 117.

A detour was then made, passing the western ends of the true Panjgur range and the more northern Koh-i-Sabz, and following the Rakshan, past its junction with the Mashkel, along the eastern extension of the Siahan Koh into the Kharan desert, and then north to Budu. Pottinger's Budur river is apparently the Mashkel; and as regards the Kharan desert, it is shown to be intersected in almost every direction by roads with a more or less plentiful water supply, and to be bisected by the natural highway of the latter river. The gradually drying Mashkel bed was then followed north-west, past its swampy source, and the travellers struck due north across the desert to the Band-i-Naru range, beyond which lies the God-i-Zirreh depression. In crossing this part of the desert, the author describes (p. 157) and figures enormous horseshoe formations of sand, similar to the "fuljes" described by Mr. W. S. Blunt in our 'Proceedings' for 1880, p. 94 (see also Blanford, *l. c.* p. 99), and also in the Appendix to Lady Anne Blunt's 'Pilgrimage to Nejd,' vol. ii. pp. 242 and 243, with woodcuts (see also vol. i. p. 160, with plate), of which Sir C. Macgregor appears to be unaware.

After following the north side of the Naru range westwards to Amir Chah, the travellers turned off north-west across the desert to the west end of the Zirreh depression, the continuation of the Shela or dry bed of the Halmand; and although the author makes little reference to personal danger, it is clear that during this part of the journey at least he must have been in a very painful position, from the ignorance of his guide and the continued want of water. The description of his last forced march is indeed anything but pleasant reading. The furthest westward point reached was "Shah Godar" of the map ("Gumbaz-i-Shah Maksud" of the text), a little to the east of the Lar Koh, and just south of the Afghan boundary.

The return journey was commenced in a southerly direction towards the Kacha Koh range, then south-east and east along the north side of the Naru range to Amir Chah, where some of the party had been left, continuing east to Lal Khan Chah. At this point, Captain Lockwood parted from the author, reaching the Indian frontier by a more direct road viâ Chageh, Nushki, Masking, and Dadar; and Sir C. Macgregor took a more southern and practically parallel route by the Morjin valley, across the Ras-Koh range, to the valley of the Budu, crossing that river, which doubles round to the east and had to be recrossed after the Tazinan range was passed, its source being in a south-westerly direction parallel to its course north of that range. After reaching Sohraf, the author travelled south-east to Nar, then north-east to Gandava, and so to Jacobabad.

The whole of these difficult routes are described accurately, with minute attention to salient features of physical geography and the special military objects of the journey. All the important topographical points are represented (in a rough fashion, somewhat obscured by shading lines) on the illustrations, of which some are strikingly peculiar, e. g. the water-worn formations of white clay on the banks of the Mashkel (p. 128).

The most important additions and corrections on the map (scale, 16 miles to the inch), compared with that of Sir O. St. John, are the numerous new positions, &c., in the desert between Panjgur and the Halmand, including ranges running more or less east and west, and towards the east breaking up the Pusht-i-Kuh of St. John; the different position of the Zirreh depression, which is not north-west and south-west, but east and west; the definition of the course of the "Mashkid" (Mashkel), which has no possible connection with the God-i-Zirreh; the continuation south-east of the Kuh Taftan peak as a range connected with the Sianeh Kuh, &c.

The work concludes with two Appendices, of which one contains details, often of considerable geographical interest (for instance, the description of the

desert immediately south of the Halmand, p. 311), of twenty-three different routes; and the other consists of observations of political importance in regard to the boundaries of Baluchistan.

Smith, George.—The Student's Geography of India. The Geography of British India, Political and Physical. London (John Murray): 1882, sm. 8vo., pp. xxvi. and 556, maps. Price 7*s.* 6*d.*

An excessively condensed mass of information ("the result of twenty years of preparation"), from the most trustworthy sources, under two heads, of which the first (by far the larger) discusses the political geography of British India in detail, and that of the colonies and countries within its political system more briefly; and the second ("Physiography") summarises the latest results of the Geological and Meteorological Surveys. Chapter II. of the first part contains a sketch of the physical geography of India as a whole; and the different provinces of Bengal, Assam, British Burma, Andaman and Nicobar islands, North-Western province (with Oudh section), Panjab, Bombay, Ajmer, Baroda Rajpootana and Central India States, Central Province, Berar, Haidarabad State, Madras, Coorg, Mysore State, and the widely-spread colonies and countries within the political system of India (including Abyssinia, North Borneo, &c.), are subsequently treated separately with their minor divisions, and also in a general way as regards the larger groups.

The frontispiece represents Europe and India on the same scale, with inset table of populations and areas of the chief countries in each as nearly balanced as possible for comparative purposes; there are also eleven maps, scale 95 miles to the inch, of the chief provinces, &c., and four isothermal and isobaric charts, with a rainfall map. The appendix contains a bibliography (pp. 511–521) roughly arranged by dates of the periods discussed in each work, with official publications and maps; and a full Index of some 5200 names enables the work to be used as a Gazetteer for ordinary general purposes.

The official spelling is retained, with the omission of accents or other marks (except sometimes to denote quantity), and with the substitution of "ee" for "i" and of "oo" for "u."

AFRICA.

Burton, Richard F., and Cameron, Verney Lovett.—To the Gold Coast for Gold. A personal narrative. London (Chatto & Windus): 1883, 2 vols., post 8vo., pp. xii. & 354, vi. & 381, maps, coloured frontispiece. Price 1*l.* 1*s.*

The strictly geographical results of the journey made by Captains Burton and Cameron to Axim at the end of January 1882, have been published in our 'Proceedings' for that year, pp. 484–486 of which volume contain a paper on the Kong Mountains by the former traveller, and pp. 501–507 a discussion by the latter of a sketch survey of the Ancobra and Prince's rivers and of the Takwa range, Gold Coast. The details are here supplied by Captain Burton, who in the first volume gives some 250 preliminary pages of interesting matter both descriptive and referential about Madeira, Tenerife, and Grand Canary, concluding it with similar treatment of Sierra Leone, which is continued in the beginning of vol. ii. The journey to Cape Palmas and Axim and thence north and north-west to Crockerville in Wasa beyond Takwa, with the return, and particulars of the mining region, occupy the bulk of this second volume, which contains in an Appendix a discussion of "the Ashanti scare," the labour question in Western Africa, and gold-digging in North-Western Africa, concluding with lists of the birds, plants, and fungi collected.

The maps are (1) of the Axim portion of the Gold Coast, scale 3 miles to the inch, showing authors' routes, with insets of the whole coast and of Africa on smaller scales; (2) a sketch survey of the Ancobra by Captain Cameron, scale about 1¼ miles to the inch, differing considerably both in direction and detail from the larger scale sketch survey map of Captain Rumsey referred to in the January number of our 'Proceedings,' and giving many more names, depths, and local references than that map.

Gaffarel, Paul.—L'Algérie. Histoire, Conquête, et Colonisation. Paris (Firmin-Didot): 1883, imp. 8vo., pp. 708, maps, chromolithographs, and woodcuts. (*Williams & Norgate:* price 1*l.* 5*s.*)

The first part, referring to the early history and the occupation by the French, is only to be noticed here from the incidental illustrations of topography. Part 2 is exclusively devoted to the geography of Algeria, pp. 369–430 containing the physical, pp. 431–548 the economical, pp. 549–639 the political, and pp. 640–686 the descriptive aspects. A good bibliographical Index, classified according to the divisions of the work, occupies pp. 687–700. The maps (coloured) are on the scale of 1 : 500,000, and are divided into Western, Central, and Eastern Algeria; and the woodcuts represent frequently objects of geographical interest, many of them being of especial value as being taken from photographs and engraved with great care.

AMERICA.

Bove, Giacomo.—Patagonia, Terra del Fuoco, Mari Australi. Rapporto del Tenente Giacomo Bove, Capo della Spedizione, al Comitato Centrale per le Esplorazioni Antartiche. Parte I. Genova (Tipografia del R. Istituto Sordo-Muti): 1883, 8vo., pp. 150, maps, illustrations.

The explorations in and about Southern Patagonia, conducted under Lieutenant Bove (with the scientific aid of Professor Lovisato, Professor Vinciguerra, Lieutenant Roncagli, and Dr. Spegazzini), preliminary to the projected Italian Antarctic Expedition, have been from time to time referred to in our 'Proceedings,' and the Genoa Central Committee has now published the first instalment of results, being a summary of the incidents of travel, routes, &c.

A second part, stated to be also now ready, contains the account of Lieutenant Bove's excursion to the "Malvine" (a further corruption of the Spanish "Malvinas," altering the French term "Les Malouines," adopted by Frézier from the visits of ships from St. Malo to the Eastern Falkland Isles), and also the results of the hydrographic and meteorologic observations of the entire voyage; and a series of special memoirs on the scientific collections made will form a third and concluding part, to be accompanied by a geological map.

The present fasciculus describes the journey from Santa Cruz to Patagonia and Staten Island, with the return to Punta Arenas, and subsequent visit to Tierra del Fuego, a separate chapter being devoted to the latter country and its inhabitants. Considerable attention is given (especially in this part) to ethnological matters, to which the illustrations refer, one of the maps also showing the distribution of Fuegian races—the Ona (roughly put at 2000) occupying the east and Staten Island, the Alacaluf (3000) the west, and the Jagan (3000) the south of the Archipelago. A short vocabulary of some 170 Jagan Fuegian words, with Italian equivalents, concludes the part, following a table of measurements of thirty-three individuals of both sexes and various ages, the tallest of whom was under 5 feet 6 inches. As bearing upon the vexed question of Patagonian stature, Lieutenant Bove makes the following observations (p. 17), when referring to the safe arrival at Santa Cruz of a drove of 400 cattle sent overland by a very long and hitherto unexplored route from the Chupat colony through the energy of Captain Moyano:—"The gaucho Garcia who had charge of the drove to Santa Cruz, when bringing back to the camp some oxen that had strayed during the night, came upon a small valley whitened with bones. Having descended into it, he might have long remained in doubt as to the exact nature of these bones, if some human skulls among them had not immediately shown him what they were. The skulls and bony relics doubtless belonged to a race which has now disappeared, as Garcia during his numerous journeys in Patagonia had never met with people having such colossal bones." Lieutenant Bove was prevented from obtaining further details from this gaucho, who lived at a long distance, but from the few indications obtained from his actual informant (Signor Obligado, Sub-delegate of the Santa Cruz Station), he presumes that the valley is near the river Deseado, about 300 miles from its mouth, and not far from Musters's route. Lieutenant Bove expresses his astonishment that such a

circumstance should have escaped the notice of so acute an observer as Musters; but it would seem more a subject for wonder that a drove of cattle from the Chupat colony to Santa Cruz, both situate on the east coast, should be driven so far inland as to cut the Deseado 300 miles from its mouth.

Many botanical and zoological observations are scattered throughout this Report (including marine animals noticed or dredged during the voyage from Montevideo to Santa Cruz); and the general description of Staten Island and its fauna and flora will be found of especial interest. Various Italian names are given to prominent features of physical geography in this island. The general map is practically a repetition of the Admiralty chart.

Crevaux, [Dr.] J.—Voyages dans l'Amérique du Sud. Paris (Hachette): 1883, 4to., pp. xvi. and 635 [no Index], maps, facsimiles, and illustrations. (*Dulau*: price 2*l*.)

This profusely illustrated account of the travels of the late Dr. Crevaux (the chief features of which have been reported from time to time in our 'Proceedings,' commencing in the vol. for 1879, p. 131) is a reproduction of the articles and plates which have appeared in the *Tour du Monde* of the same publishers, of which the first part is contained in vol. xxxvii. (p. 337), and the last in vol. xliv. just completed, supplemented by a biographical account of the traveller by M. E. Le Janne, who accompanied him on his third voyage.

The work is divided into four parts, of which the first describes his journeys in the interior of French Guiana in 1876 and 1877, when he ascended the Maroni to the previously unvisited Tumuc-Humac range, which he crossed, reaching the mouth of the Amazons by its northern tributary the Jary, the course of which he first correctly defined, discovering grand falls. The second part includes his work in 1878 and 1879 on the Oyapok, the south-eastern boundary of French Guiana, the Paru, a northern affluent of the Lower Amazons, and the Içá (or Putumayo) and Japurá, tributaries of the Upper Amazons. The third contains his journeys in the United States of Colombia and Venezuela in 1880 and 1881, when, with M. Le Janne, he ascended the Magdalena, crossed the Andes to the Guaviare or Guayabero, and descended that river and the Orinoco; and the fourth consists of notes communicated by M. Le Janne on the late traveller's excursion in 1881 among the primitive Guaraunos of the Orinoco delta. It was his intention in his last voyage, on which he started in November 1881, to ascend the Paraguay and reach the Amazons from the south by the Tapajos, but he met his death in the end of April last at the hands of Tobas Indians at Teyo, a small village on the Pilcomayo, of which he was endeavouring to make a preliminary exploration.

The chief geographical results of this succession of brilliant journeys are, in addition to the correct definition of the Tumuc-Humac range, the exploration of the previously but little known rivers Maroni, Oyapok, and Içá, the practically quite unknown Jary and Paru, some 950 miles of the course of the Japurá, about 1275 miles of new country during the voyage down the Guaviare branch of the Orinoco (with which even the natives were unacquainted), the determination of various astronomical positions in Salta and Jujuy, &c. Having paid special attention to the botanical resources of the region explored, Dr. Crevaux gives many valuable notes on the economic plants observed, especially remarking that vast forests of magnificent trees on the Maroni and Oyapok are now allowed to go to decay unutilised. His observations on objects of ethnological value have also in one instance an immediate importance, as he proves the existence far in the territories of Dutch and British Guiana of sculptured stones similar to one at the mouth of the Oyapok, claimed by the Brazilians as a boundary stone and supposed to be marked with the arms of Charles V.

The many falls, rapids, and other hydrographic features of the rivers explored are detailed and illustrated profusely (there are in all 253 engravings, many full-page). The maps are as follows:—(1) a general map of South America as far south as the Amazons mouth (scale 1 : 17,000,000), showing Dr. Crevaux's three great voyages; (2) French Guiana, scale 1 : 4,000,000, giving further details of the Maroni, Jary, &c.; (3) the Japurá and Içá, scale 1 : 6,500,000; and (4) the Magdalena, Guaviare ("De Lesseps" on the map), and Orinoco,

scale 1 : 7,500,000, with various reproductions of route and other sketches. These maps are apparently taken from an atlas on a larger scale entitled "Fleuves de l'Amérique du Sud," published in Paris by the French Geographical Society in Dr. Crevaux's name under date of 1882, which contains details of such parts of the rivers above named as were first explored by him, as follows:—The Oyapok, two sheets, scale 1 : 225,000; the Ruapir, a feeder of the Jary, one sheet, scale 1 : 200,000; the Jary, to its confluence with the Amazons, two sheets, scale 1 : 225,000; the Paru, eight sheets, scale 1 : 125,000; the Içá, ten sheets, scale 1 : 200,000; and the Japurá, twelve sheets, scale 1 : 225,000.

POLYNESIA.

Gordon Cumming, C. F.—Fire Fountains; the Kingdom of Hawaii, its Volcanoes, and the History of its Missions. Edinburgh & London (Blackwood): 1883, 2 vols., 8vo., pp. 297 and 279, maps, illustrations. Price 1*l.* 5*s.*

Contains a copy of a map by Mr. W. T. Brigham, showing the principal lava-flows from Mauna Loa up to 1868, and a short account of the chief eruptions of that volcano between 1789 and 1877, chiefly from information from the Rev. Titus Coan.

GENERAL.

Whitney, J. D.—The Climatic Changes of later Geological Times: a Discussion based on Observations made in the Cordilleras of North America. Cambridge [U.S.A.] (University Press, John Wilson & Son): 1882, 4to., pp. xiv. and 394.

This interesting work is a separate publication of No. 2, vol. vii. of the Memoirs of the Museum of Comparative Zoology at Cambridge, Massachusetts (an institution which must allow an excessively wide range for its subject), and is intended to be taken in connection with the author's treatise on the Auriferous Gravels of the Sierra Nevada of California, part of which has already been published. In the collection of material for that treatise, Mr. Whitney's study of glacial phenomena led him to form certain conclusions on matters of physical geography, the chief of which was that, following a period of excessive precipitation required to bring about the accumulation of the gold deposits, there has been during recent geological times a constant diminution in the quantity of water standing and flowing on the surface throughout the region of the Sierra—a condition of things proved also to exist in the central and eastern portion of the Cordilleras by the Survey of the Fortieth Parallel and other recent surveys. Between these two periods of precipitation and desiccation, another one of ice-extension intervened in the higher portions of the most elevated ridges of the Cordilleras; and Mr. Whitney has endeavoured to show the existence of a similar succession of events generally throughout the world, with the ultimate object of proving the so-called glacial epoch to be a local phenomenon, during the occurrence of which much the larger part of the land-masses of the globe remained climatologically entirely unaffected. Recurrent periods of greater heat and cold are rejected, and a diminution of the earth's mean temperature during successive geological ages is accepted as the conclusion of all obtainable evidence.

In discussing this question, Mr. Whitney has brought together a mass of information, derived from the United States Geological and Geographical Surveys, the works of ancient and modern travellers and scientific men, and received geographical authorities. After some general considerations as to geological results produced by ice (which he thinks are considerably overrated), and the origin of lakes and fjords, he describes the former glaciation of the Sierra Nevada, the Pacific Coast, and the Cordilleras in general (with a discussion of Valleys and Cañons, in which received opinions as to "aqueous" and "glacial" forms are somewhat modified). Passing to the question of desiccation, the evidences of drying up of the lakes on the western side of the North American Continent, and of the diminution of water supply in other parts of the world, especially in Asia, are passed in review; and the author enters at some length upon the general point whether this is the result of partial or entire removal of forests by

the hand of man, quoting authorities freely which are opposed to his own convictions that desiccation began before man existed, and that an increase or regulation of precipitation is beyond human power.

Having next stated the numerous opinions endorsing the idea that the phenomena of desiccation are simply a phase of the glacial epoch, from which the author entirely dissents, he proceeds to examine the conditions favouring or tending to diminish precipitation upon the earth's surface, and the evidence of increase of extent of land surface on the globe during geologic ages, passing to a review of signs of former changes of temperature on the earth, and of theories of the causes of such changes.

The present distribution of snow and ice throughout the world is noted at some length, with recent changes in glacier regions, and a discussion of the conditions and extent of past glaciation, in the concluding portion of the work devoted to a controversion of the so-called "glacial epoch." The theory of a polar ice-cap is abandoned, as also is the idea that an increase of cold would bring about extensive glaciation.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

World.—Grand Planisphère Terrestre. Larochette et Mayer. 2me ed. revue et corrigée. Rothschild, Paris. 4 sheets. Price 10*s.* (*Dulau.*)

EUROPE.

Metz, Karte der Umgegend von——. Scale 1 : 25,000 or 2·9 inches to 1 geographical mile. Königlich. preuss. Landesaufnahme 1880. Herausgegeben 1882. Berlin. 4 sheets. Price 6*s.* (*Dulau.*)

Westpreussen, Neue Karte der Provinz——. Scale 1 : 300,000 or 4·1 geographical miles to an inch. 4 sheets. Price 4*s.* (*Dulau.*)

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ENGLAND: Nottingham, sheets XXXVII. **4.**—9, 10, 14, 15, 18, 19, 20, 22, 23, 24, 25; XXXVII. **8.**—2, 4, 5, 7, 8, 9, 13, 14, 15, 18, 19, 20, 24, 25; XXXVII. **12.**—4, 19, 20, 25; XXXVII. **16.**—4, 5, 10, 15, 19, 20, 24, 25; XXXVIII. **1.**—11, 12, 13, 16, 17, 21, 22; XXXVIII. **5.**—1, 2, 3, 6, 7, 11, 12, 13, 16, 18, 21, 22, 23, 24; XXXVIII. **6.**—21, 22; XXXVIII. **9.**—1, 2, 3, 4, 5, 8, 9, 13, 16, 18, 20; XXXVIII. **10.**—1, 6, 7, 8, 9, 12, 14, 16, 17, 18, 19, 21, 24, 25; XXXVIII. **13.**—1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25; XXXVIII. **14**—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25; XXXVIII. **15.**—1, 6, 11, 16, 21, 22, 23; XLI. **8.**—9, 10, 14, 15, 18, 19, 20, 23, 24, 25; XLI. **12.**—3, 4, 5, 10; XLII. **1.**—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24; XLII. **2.**—1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 15, 16, 17, 18, 19, 20, 21, 23, 25; XLII. **3.**—1, 2, 3, 6, 7, 8, 11, 12, 16, 17, 21, 22; XLII. **5.**—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25; XLII. **6.**—1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25; XLII. **7.**—1, 2, 6, 7, 11, 12, 16, 17; XLII. **9.**—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25; XLII. **10.**—1, 2, 3, 4, 6, 8, 11; XLII. **13.**—2, 3, 4, 8, 2*s.* each.

Index Map.—Index to the County of Derby, 6-inch scale, showing Quarter Sheets to be photozincographed. Scale of Index 4 miles to 1 inch.

ASIA.

China, Karte eines Theiles des Süd-Westlichen——. Hauptsächlich nach neueren Forschungen in Ssŭ-Chuen und Yün-Nan. Entworfen u. gezeichnet v. B. Hassenstein. Scale 1 : 2,000,000 or 27 geographical miles to an inch. Petermann's Geographische Mittheilungen,' Jahrgang 1883, Tafel 1. Justus Perthes, Gotha. (*Dulau.*)

Indian Government Surveys:—

Bombay Presidency: Trigonometrical Branch, Survey of India. Guzerat. Scale 2 inches to 1 stat. mile. Sheet 33, Section 3 (Seasons 1879-80, and 1880-81). Part of the Mándvi Táluka of the Surat Collectorate. Sheet 34, Section 1

(Season 1880-81). Parts of the Bárdoli and Mándvi Tálukás of the Surat Collectorate.—Trigonometrical Branch, Survey of India. Section No. 5 of Sheet No. 49 of Guzerat (Dáng Forests). Sale 4 inches to 1 stat. mile. Parts of the Dáng Derbhavti, and Dáng Gárvi, States. Season 1880-81. Section No. 8 of Sheet No. 49 of Guzerat (Dáng Forests). Parts of the Dáng Kirli, Dáng Derbhavti, Dáng Shivbara, Dáng Gárvi, and the Dáng Palásvihir States (Season 1880-81).—Trigonometrical Branch, Survey of India. Sheet No. 77 of Guzerat. Scale 1 inch to 1 stat. mile. Parts of the Ahmedabad Collectorate of the Gáikwar's Territory and of the Mahi Kantha and Rádhanpur States, and of Káthiáwár. Season 1880–81.—Bengal Presidency: Lower Provinces Revenue Survey. Index to the Sheets of District Noakholly.—Map of the District of Hoshiarpur, Surveyed by Lieutenants W. C. Hutchinson and T. C. Blagrave, Revenue Surveyors, in 1847–48 and 49. (Third Edition.) Scale 2 stat. miles to an inch. 4 sheets.—District Sibsagar, Assam. Scale 4 stat. miles to an inch. Seasons 1862–75.—District Sylhet, Assam, 1860–66. Preliminary Map. Scale 4 stat. miles to an inch.—North-West Provinces Survey. Sheet No. 1. Scale 1 inch to 1 stat. mile. District Saharanpur. Seasons 1879–80–81. Sheet No. 2. Scale 1 inch to 1 stat. mile. District Saharanpur. Seasons 1878–79–80. Sheet No. 5. Scale 1 inch to 1 stat. mile. Districts Muzaffarnagar and Meerut. Seasons 1878–79–80. Sheet No. 6. Scale 1 inch to 1 stat. mile. Districts Muzaffarnagar and Meerut. Seasons 1878–79–80. Sheet No. 18. Scale 1 inch to 1 stat. mile. District Meerut. Seasons 1879–80–81. Sheet 28. Scale 1 inch to 1 stat. mile. Districts Saharanpur and Muzaffarnagar. Seasons 1878–79–80. Sheet No. 28 (N.W.). Scale 2 inches to 1 stat. mile. Districts Saharanpur and Muzaffarnagar. Seasons 1878–79–80. Sheet No. 28 (S.W.). Scale 2 inches to 1 stat. mile. District Muzaffarnagar. Seasons 1878–79–80. Sheet No. 29. Scale 1 inch to 1 stat. mile. Districts Muzaffarnagar and Meerut. Seasons 1878–79–80.—Madras Presidency: Mysore Topographical Survey. Scale 1 inch to 1 stat. mile. Sheet No. 21. Parts of Kadur and Shimoga Districts. Seasons 1878 to 81. Sheet No. 49. Parts of Hassan and Kadur Districts. Seasons 1879–81.—Trans-Frontier Surveys: Northern Waziristan and Dawar Valley. Scale 1 inch to 2 stat. miles. Surveyed during the expeditions of 1860 and 1881 by Officers of the Indian Survey Department. Southern Waziristan. Scale 1 inch to 2 stat. miles. Surveyed during the expeditions of 1860 and 1881 by Officers of the Indian Survey Department.

AFRICA.

Caire, Carte des environs du ——, dressée d'après les cartes de l'expédition française et de Mahmoud-Pacha. H. Vaujany. Erhard, Paris, 1882. (*Dulau.*)

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in September, October, November, and December, 1882.

No.			Inches.	
2661 *a*, *b*.	m	=	0·05	China sea, northern portion. 2 sheets. Price 2*s*. 6*d*. each.
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462	m m	= =	1·0 3·0	West Indies:—Grand and Lesser Caymans. (Plan, George Town anchorage.) Price 2*s.*
1446	m	=	10·0	Scotland, east coast:—Aberdeen harbour. Price 1*s.* 6*d.*
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991	Plan added, Hamanaka bay.			
550	Plan added, Sao Francisco harbour.			
993	Plans added, Urakawa bay. Mori roads.			
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(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
2661	*a*, *b*. China sea, northern portion, 2 sheets	New charts, China sea, northern portion, 2 sheets	2661 *a*, *b*.
597	Cape Correntes to Juba islands	New chart, Delagoa bay to cape Guardafui	597
598	Juba islands to Mascat		
347	Percy isles to Whitsunday island	New chart, Percy isles to Whitsunday island	347
596	Hollams island to cape Correntes.		
1187	Alicante to Palamos	New chart, Alicante to Palamos	1187
392	Gulf of Mexico	New chart, Gulf of Mexico	392
604	Banda point to St. Paul de Loanda	New chart, C. Lopez bay to St. Paul de Loanda	604
626	St. Paul de Loanda harbour		
1318	Port Valdivia	New plan, Port of Valdivia	1318
359	Harbours in Japan	New chart, Nagasaki to Karatsu	359
462	Grand Cayman island	New chart, Grand and Lesser Caymans	462
1446	Aberdeen harbour	New plan, Aberdeen harbour	1446
1955	Mocha road	New plan, Mokha road	1955
587	Coiba island to Mangrove bluff	New chart, Burica point to Mangrove bluff	587
2471	Plan of Connecticut river	New plan, Connecticut river	2470
595	Anno Bom to Hollams island.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 721. South Indian ocean:—Seychelle Group. 2045. England, south coast:—Owers to Christchurch. 2154. England, south coast:—Newhaven. 1756. Spain, west coast:—Cape Finisterre to Vigo bay. 2062. China:—Tong-King gulf. 2366. Baltic sea:—Arkona to Stettin bay. 1258. China:—Approaches to Séoul. 2866. United States:—Winyah bay and Georgetown harbour. 967. Eastern archipelago:—Palawan island. 948. Eastern archipelago:—Balabac strait, and channels between Borneo and Paláwan. 1755. Spain, west coast:—Ferrol harbour to cape Finisterre. 1769. China:—Chinchu harbour. 744. India, west coast:—Cape Ramas to Alvagudda. 1833. England, east coast:—Medway river, sheet 1. 2112. Borneo:—Ambong bay to Sampanmangy point. 764. South Pacific ocean:—New Hanover, New Ireland, and New Britain. 2691. South Pacific ocean:—Fiji islands. 1249. Fiji islands:—Ovalau and Moturiki islands. 2776*a*. Africa, west coast:—Kwara river. 2185. New Zealand:—Nelson anchorage. 941*b*. Eastern archipelago, western portion. 1033. Australia, west coast:—Champion bay to cape Naturaliste. 1277. South America, west coast:—Grande point to San Francisco point. 2160. Eastern archipelago:—Carimata strait. 2660*b*. China sea, southern portion. 2600. West Indies:—San Domingo to Dominica. 185. Baltic sea:—Port Swinemunde and approaches to Stettin. 279. Newfoundland:—Cape Rouge and Croc harbours. 1848. Spain, south coast:—Port of Malaga. 627. Africa, west coast:—St. Paul de Loanda to Great Fish bay. 1929. Central America, west coast:—Bahia Honda. 1493. Central America, east coast:—Port Chagre, Colon bay, &c. 771. Oosima group:—Hancock bay. 623. Africa, west coast:—Fernando Po island. 653. Africa, east coast:—Ports Conducia, Mozambique, &c. 109. England, east coast:—Humber river entrance. 2889. Gulf of Mexico:—Atchafalaya bay. 2842*b*. Baltic sea. 452. Japan:—Yezo island. 1234. Africa, west coast:—Port Nolloth or Robbe bay. 2366. Baltic sea:—Arkona to Stettin bay. 761. West Indies, sheet 1. 762. West Indies, sheet 2. 763. West Indies, sheet 3. 2441. Japan:—Tsugar strait. 2759*a*, *b*. Australia, 2 sheets. 2365. Baltic sea:—Rostock to Arkona light. 2060*b*. North Atlantic, western portion. 2405. Japan:—Kuril islands from Nipon to Kamchatka. 2441. Japan:—Tsugar strait. 2591. New Zealand:—Waiau river to cape Foulwind. 2616. New Zealand:—Cape Foulwind to D'Urville island. 1256. China:—Pe-chili and Lian-tung gulfs. 40. India, west coast:—Karachi harbour. 2296. Baltic sea:—South Quarken to Hornsland. 2845. Channel islands:—Alderney harbour. 1357. Africa, west coast:—Cape Formoso to Fernando Po island. 1098. Gulf of Mexico:—Lower Matacumbe cay to Boca Grande. 269. North America, east coast:—Sapelo sound to Florida. 1101. Pacific ocean:—Mariana or Ladrone islands. 469. Spain, south coast:—Alicante port. 751. India, west coast:—Ajengo to cape Comorin. 2675*b*. English channel. 2471. North America, east coast:—New London harbour. 2432. Korea:—Tumen Ulu to Strelok bay. 214. Pacific ocean:—Solomon islands. 1982*c*. South America, east coast:—Parana river, 2894. China:—Liau river entrance to Tien-Chwang Tai. 821. Bay of Bengal:—Elephant point to Cheduba strait. 822. Bay of Bengal:—Cheduba strait to Coronge island. 2614. New Zealand:—Kaipara harbour. 1959. China:—Hu-i-tau and Chimmo bays. 1824*a*. Ireland, east coast. 1787. Ireland, east coast:—Wexford to Wicklow. 2049. Ireland, east coast:—Brattin head to Wexford. 2738. India, west coast:—Cochin to cape Comorin. (*J. D. Potter, agent.*)

UNITED STATES CHARTS.

No. 348. Port Royal and Kingston Harbours, Jamaica. Price 1*s*. 8*d*. No. 622. West Coast of Mexico from Mazatlan to Tenacatita Bay. Price 1*s*. 8*d*. No. 823

and 823 (*a*). South Pacific Ocean. Sheet 1 (in 2 parts). Price 2*s.* 1*d.* each sheet. Published 1882, at the Hydrographic Office, Washington, D.C. J. C. P. de Krafft, Commo. U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

Atlas Manuel de Géographie Moderne, contenant cinquante-quatre Cartes imprimées en couleur. Une livraison par mois. A partir d'Octobre 1882. 1e Livraison. Paris, Librairie Hachette & Cie. Price 2*s.* 3*d.* (*Dulau.*)

This Atlas is an abbreviated French edition of Andree's "allgemeiner Hand-Atlas." As at present arranged, it is to come out in monthly numbers, and it is to be hoped that it will appear with more regularity than the Vivien St. Martin Atlas, which is in course of publication by the same firm (Hachette & Cie.), and of which only 3 parts, containing 3 maps each, have appeared since the issue of the first number in 1877.

Documents Géographiques conservés à la Bibliothèque Nationale, Choix de ——. Notice des Provinces de l'Empire et Notice des Cités de la Gaule (VIe Siècle). Mappemonde de Saint-Sever (XIe Siècle). Carte Pisane (XIVe Siècle). Atlas Catalan de Charles V, Roi de France, de l'Année 1375. Paris, Maisonneuve et Cie., Libraires-Editeurs, 1883. Price 2*l.* 10*s.* (*Williams & Norgate.*)

Oesterreich-Ungarn, Physikalisch-Statistischer Hand-Atlas von——, in 24 Karten mit erläuterndem Text, unter Mitwirkung von Vincenz v. Haardt, Prof. Dr. Anton Kerner Ritter v. Marilaun, Franz Ritter v. Le Monnier, General-Major Carl Sonklar v. Innstätten, Prof. Dr. Franz Toula, herausgegeben von Dr. Josef Chavanne und ausgeführt in Eduard Hölzel's Geographischem Institute. 2. Lieferung. Containing the following maps:—Nr. 2. Wärmevertheilung im Jänner (mittlere Jänner-Temperatur). Nr. 3. Wärmevertheilung im Juli (mittlere Juli-Temperatur). Nr. 17. Heereswesen und physische Tauglichkeit. Wien, Hölzel, 1882. Price 7*s.* (*Dulau.*)

Vuillemin, A.—Atlas de l'Europe physique. Edition avec tracé des lignes de chemins de fer. Bassins des grands fleuves de France et de l'Europe, d'après les documents les plus autorisés. Paris, Delalain. Price 12*s.* (*Dulau.*)

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

On the Various Means of Communication between Central Persia and the Sea. By Colonel J. U. Bateman Champain, R.E.

(Read at the Evening Meeting, January 15th, 1883.)

Map, p. 184.

I suppose that no country in the world of similar importance is so poorly off as Persia for the means of locomotion. With one exception, to which I intend before concluding to direct your attention, there is in this extensive empire not one navigable river or canal; and as regards roads the condition of Persia is but little removed from barbarism.

Wheeled vehicles are practically unknown, excepting on the road from Cazvin to Tehran where quite lately a service of troikas on the Russian system has been organised with tolerable success. Caravan routes are but tracks worn over steep and stony mountain ridges or over gravelly plains by the feet of mules and camels for century after century. Bridges are rare, and where most wanted are too often represented by the ruined piers and abutments of some clumsy massive construction of a bygone age.

The traveller, mounted according to his rank or means on horse, mule, donkey, or camel, proceeds at the rate of some 20 miles a day, and is fortunate if he escapes snowdrifts in winter, mountain torrents in the spring, and sunstrokes in the summer. During the hot season, however, marches are nearly always performed in the cool hours of the night. The principal routes are provided with caravanserais at distances of some 10 to 20 miles apart; and on the main post-roads there are less substantial but not unwelcome places of shelter known as *chuppar khanehs* or post-houses. In these, travellers of the better class find rooms in which to rest. No furniture is supplied, save perhaps an old and villanously dirty carpet or rug which should be avoided by all but those who enjoy the excitement of hunting that species of game familiar to the readers of Mark Twain as the "chamois."

Very little indeed is done by the government of the country to improve the communications. During the past 20 years the Shah has, it is true,

spent considerable sums on the routes between the capital (Tehran) and the Caspian; but elsewhere the caravanserais, causeways, and bridges have been made generally speaking by private individuals, and when once made they are expected to take care of themselves.

Persia is somewhat more than 600,000 square miles in extent. It may be roughly described as a plateau averaging from 3000 to 5000 feet elevation above the level of the sea. A great proportion is salt desert; the rest consists of more or less fertile valleys lying between rugged, barren ranges of mountains. The productiveness of some of the more favoured localities is in truth amazing. Wherever the soil is good, and wherever water from the melting snows on the heights above can be utilised, the glorious Eastern sun can be depended upon to ripen the crops. Depressions, disturbances, and the numerous disagreeable meteorological phenomena daily noted in our newspapers for the instruction of those who wish to study the probabilities of our climate, are unknown; and summer in Persia is summer indeed.

Were water more abundant the capabilities of many parts of the country would be prodigious, and the population would be infinitely larger than it is. I believe there are not more than six millions of souls in Persia, including the Iliyáts or wandering tribes, but there are no trustworthy means of estimating the number of the inhabitants. Still the trade of the country is considerable, and might be vastly increased were measures taken to open up roads where there are none, and to improve the rude apologies for roads which exist.

Persia produces grain of all kinds, cotton, tobacco, silk, opium, fruits, dates, wool, hides, carpets, rugs, and in fact an immense variety of the necessaries and luxuries of life. There is, on the other hand, a large demand for cloth, cotton fabrics, sugar, tea, coffee, and all the innumerable comforts called for by a moderately civilised community. It is difficult to name an article which cannot be obtained in the bazaars of Tehran, Tabriz, Ispahan, and Shiraz; and it is a fact which unpleasantly strikes the English traveller, that a very much greater proportion of these articles is imported from Russian than from British sources. Twenty years ago it was otherwise; but of late great changes have taken place in the neighbourhood of Northern Persia, all tending to improve the conditions under which the Russian competes with the British merchant. Many hundred steam vessels now ply on the Volga. A regular service is kept up during the season between the mouth of that river and the Persian ports of the Caspian; which ports are, as I remarked above, the only places which the Shah has cared to connect with the capital by fairly good roads. A railway now runs between Poti on the Black Sea and Tiflis, the capital of the Caucasus, and has just been completed to Baku, while it is merely a question of time when the railway system of the Caucasus will be extended to the Persian frontier on the Arax, less than 100 miles from Tabriz.

I may add that, owing to the favourable natural features of the country, the road onwards from Tabriz to Tehran is the easiest 400 miles to traverse in all Persia.

On the other hand, the shortest and most generally followed road from Bushire to the interior is peculiarly difficult. No less than six severe passes have to be surmounted between the sea and Shiraz, a distance of 180 miles, and at two spots the track rises to an altitude of nearly 7000 feet. From Bushire by Shiraz to the capital (where there is of course the greatest demand for European products and manufactures) the distance is between 700 and 800 miles, so that it is natural that under any circumstances the trade from the southern ports would be eclipsed in the *north* by that from the Caspian and Caucasian provinces of Russia. But in consequence of the special, and what I may term artificial, advantages of the northern routes, it is but too evident that Russian manufactures are steadily superseding British wares at Ispahan and even in the Persian markets south of that centre.

Now it seems to me a matter of some interest and importance to consider what steps might be taken to smooth away the obstacles which impede the free movement of trade in the south of Persia, and to open up new markets.

Bushire is beyond comparison the largest and wealthiest port of the Persian Gulf, and at this place some of the members of an influential English firm (I speak of Messrs. Gray, Paul & Co.) habitually reside. The firm has native agents in the interior. There are very few Europeans in Persia engaged in trade. I think I am right in saying that except at Bushire there is not a single English mercantile man in the country. At Bushire also are the headquarters of the British Residency in the Gulf, and from Bushire to Shiraz and the north lies the principal trade route connecting the Gulf with Central Persia. But Bushire has no harbour worth mentioning, and ships of any size are compelled to anchor in the roads three or four miles from land. The road to Shiraz has been described over and over again, and I need not waste time by saying more than that it is execrably bad.

Two years ago I was travelling from Shiraz to the sea, and it happened that the fall of rain (and snow on the higher levels) was unusually heavy. The roadway or rather staircase through one of the most troublesome passes was entirely swept away by the torrent, and I found myself absolutely cut off from the haven where I would be. In the end my companion and I were forced to abandon our horses, and with the help of some hardy mountaineers who shouldered our luggage, we had to clamber literally on hands and knees down precipices of many hundred feet, and finally, after several days' trudge, succeeded in borrowing horses and riding through 25 or 30 miles of water to the coast. To improve this route in any marked degree would involve an expenditure so large as to be, for the present at least, out of the question.

Following the coast eastward we find one or two comparatively insignificant towns such as Charak, Lingah, &c. But they are cut off from the interior by almost impenetrable mountain ranges, and the country at their rear is unexplored. It may be assumed, I think, with certainty that no practicable trade route to the interior exists between Bushire and Bunder Abbas. This last town is, as is well known, the port of Kirman, and was formerly a place of very much greater commercial importance than at present. In the matter of harbour accommodation it offers advantages, but the town and neighbourhood are exceptionally unhealthy and hot, so that the wealthier native merchants of the place desert it, during the greater part of the year, for the shady groves of Minàb, 50 miles to the east. For Europeans Bunder Abbas is scarcely habitable. The roads inland to Kirman and Yezd are not so well known to us as those from Bushire to Shiraz, but they have been during the last few years traversed and described by Colonel R. M. Smith, R.E., Director of the Persian Telegraphs, and more recently by Mr. Ernest Floyer (formerly also of the Indo-European Telegraph) whose interesting work entitled 'Unexplored Baluchistan,' gives an admirable description of the kind of track dignified by the name of road in these countries. That from Bunder Abbas to the interior is exceedingly arduous, and the passes rise in some cases to between 8000 and 9000 feet above the sea. They are usually blocked by snow for weeks, even *months*, every year. Mr. Floyer states that a loaded caravan will reach Kirman in twenty-four days, and Yezd in twenty-seven days, and it is quite evident that the Bunder Abbas route to the interior is unable to compete with the Bushire line for any traffic except that to and from Kirman and Yezd.

The road from Baghdad to Tehran, a distance of about 500 miles, is far easier than either of the two I have mentioned. A considerable portion of the English goods destined for Ispahan and Tehran takes this direction. The objections to it are the necessity of transshipping the merchandise into river steamers at Bussorah, and the exaction of transit or custom charges by the Turkish authorities. It is scarcely necessary to observe that from a commercial point of view it is desirable to avoid the passage of more States than can be helped.

I would not, however, say one word against a proposal to open up and improve this route. An excellent letter drawing attention to the desirability of a railway between Baghdad and Khanakin, close to the Persian frontier, appeared in *The Times* a very few days ago. Mr. Plowden, the writer, has like myself been struck by the increasing disadvantages (comparatively speaking) under which British trade is carried on with the markets of Northern Persia; and he even advocates the construction of a line of railway over the entire distance between Baghdad and Tehran. I am inclined to doubt whether such an undertaking could be made to pay. I know the whole road well, and am certain that the first cost of such a line would be very heavy. Between Khanakin and

Kirmanshah and in the neighbourhood of Hamadan the physical difficulties are great, and I believe the local traffic would be insignificant. But I cordially agree with Mr. Plowden in thinking that a railway as far as Khanakin, over about 100 miles of easy country, would prove of great benefit and it might possibly be extended hereafter.

For the reasons I have attempted to explain, it has long been considered by those interested in the question that the Karùn river (to which I meant to allude at the beginning of the paper as the one navigable stream in Persia) offers advantages which should not be overlooked. In the volume of the Geographical Society's Journal for 1844 is a very complete and interesting account of Lieutenant Selby's expedition made in 1842 by steamer from Mohammerah as far as Shuster, and a perusal of that paper enables one to form a tolerably good notion of the commercial facilities offered by this route. There are, however, two obstacles to the establishment of a regular service of steamers on the Karùn: one, the rapids at Ahwaz; the other, the extraordinary supineness, not to say opposition, manifested by the Persian Government.

Mohammerah as a port presents unusual advantages. It communicates with the Persian Gulf not only by the Shat-el-Arab which is navigable by ocean steamers of moderate tonnage, but also by the Khor Bamushir which was in former ages the embouchure of the Karùn, and which gives a channel not less than nine feet deep at low water. The Khor Bamushir is Persian on both sides, while the right bank of the Shat-el-Arab is Turkish territory. The development of trade by the Karùn would be of great benefit to Persia, and Mohammerah might rival in importance its neighbour the Turkish port of Bussorah. The climate of Mohammerah is good throughout the year, and from November up to the end of March may almost be called cold.

The town of Shuster is as nearly as possible at the same distance from Ispahan as Shiraz, and the road, according to Mr. Mackenzie, of the firm of Gray, Paul & Co., is less difficult than that from Bushire to the interior. Mr. Mackenzie made the journey in 1875, and in his opinion, which is upheld by Sir William Taylour Thomson (late Her Majesty's Minister at Tehran) the advantages of the route from Mohammerah over those of the ordinary line by Shiraz are very considerable. The country between Ispahan and Shuster was until recently full of danger to travellers and traders, the Bakhtiari tribes who occupy it being noted robbers, but a marked change has taken place in this respect, and it may reasonably be anticipated that this route when open to commerce may become as safe as those in other parts of the south of Persia. Mr. Baring, of Her Majesty's Mission, and Captain Wells, R.E., of the Persian Telegraphs, travelled over this road so lately as November 1881, and were very cordially and kindly received all along the route by Hassan Kuli Khan the chief of the Bakhtiaris, and his officers. Captain Wells has sent me a very graphic and amusing account of the

trip, accompanied by a valuable sketch map of the road, but I gather from what he writes that he is not nearly so sanguine as Mr. Mackenzie about the immediate practicability of opening out this line. It seems probable, however, that the establishment of a regular caravan road between Ispahan and Shuster would lead to the discovery here and there of easier routes than those followed by Mr. Mackenzie, and afterwards by Mr. Baring and Captain Wells. Caravanserais and bridges would in time be provided and the means of travelling be generally ameliorated. I am however deeply grieved to record that Hassan Kuli Khan, the chief so friendly to Mr. Mackenzie and the other English travellers, was on the 13th of last June seized and put to death (in a manner and in acccordance with a policy too common in Persia) by the Prince Governor of Ispahan. Hassan Kuli Khan, the Bakhtiari Ilkhani, was, I have been told, a man whose own hands were anything but clean of blood-stains, but at least he kept his turbulent followers in order and was apparently really anxious to co-operate in fostering the establishment of a caravan route through his district. The present is therefore not precisely the moment to commence operations in this territory, but the scheme need not on that account be discarded, and under any circumstances the establishment of trustworthy communication by the Karùn between Mohammerah and Shuster and Dizful would open up a new and promising field to the British trader, whose operations would gradually but certainly extend northward as opportunities presented themselves. Mr. Mackenzie, whose experience of Persia enables him to calculate very closely the cost of caravan transport, believes that were the Karùn opened up to Shuster his firm could deliver goods at Ispahan at 35 krans (a kran being worth about 10*d.*) per load of 350 lbs. as against 60 krans per load sent from Bushire to Ispahan viâ Shiraz; and he estimates that under such conditions trade by the Suez Canal would beat that by the north completely out of the field.

It should be noted, moreover, that until recently the main trade-route of the north of Persia lay from the shores of the Black Sea through Turkey, a line open, of course, to British as well as to Russian merchandise. The rapidly increasing railway system of the Caucasus will soon absolutely close this route for all practical purposes, and leave the trade solely in the hands of Russia, who by means of differential tariffs will be in a position to exclude British goods altogether. From a purely Persian point of view, therefore, it is most desirable that steps should be taken to counteract the tendency of the existing system to place the country in a commercial sense at the mercy of her formidable neighbour. Free navigation of the Karùn would open Persia to British enterprise, and would emancipate commerce in the north as well as in the south from dependence on the forbearance of the Russian custom-houses.

Cotton from Ispahan, of a superior quality, would find its way to the coast by Shuster, water carriage enabling the merchant to ship it

at a profit to India and England. Business in this staple is now insignificant, owing to the enormous cost of caravan transport. Petroleum is another valuable article which abounds in parts of Fars and Khuzistan, and it might be utilised as fuel on the river steamers, as is done on the Caspian and Volga. As an illustration of the enormous loss Persia annually sustains from her defective means of carriage, I may mention that when a few years ago Major the Honourable George Napier visited Kirmanshah he found about 80,000 tons of wheat stored, of little value to any one on account of the impossibility of removal. The price of wheat at Kirmanshah was 7 krans for 700 lbs., while at Tehran or Bushire it is never less than 30 or 40, and usually much more. In exchange for the above-mentioned 80,000 tons of grain, no less a sum than 700,000*l.* might have passed into Persian pockets had it been possible to convey the corn to Mohammerah.

Although Captain Selby, with the Indian steamer *Assyria*, succeeded in ascending the Karùn to within five miles of Shuster, and the Diz close up to Dizful, and though it has been ascertained that by the Abigargar canal, river steamboats could in the driest season approach to within a mile of the first-named town, yet the natural obstruction of the river at Ahwaz would prove a very serious and it may be said fatal hindrance to regular through-running between Shuster and Mohammerah. From Ahwaz to Mohammerah is easy and open. From Ahwaz to Shuster is also not difficult. In December 1881, Captain Wells, R.E., visited Ahwaz and sent me a carefully surveyed plan of the rocks which impede the course of the river. At Band-i-kir the three streams, the Diz, the Karùn, and the Abigargar meet. Owing to the nature of the country and the great difference of level between the river beds above and below the rapids, Captain Wells thinks that to open a passage by blasting would probably do more harm than good, and he considers that the best plan to follow would be to dig a canal from the narrows at A in the accompanying map (inset map p. 184) to the pool above Ahwaz, marked B, following the line on the map. Two locks would be required, and the excavation, which would be 2350 yards in length, would never exceed 35 feet in depth, even to give 8 feet of water in the canal. The soil, too, seems to be very suitable for such a work. The execution of this canal would not require any very great outlay, and it would most certainly give to Persia what she urgently needs, an easy highway from some of her richest but most inaccessible provinces. For Kirmanshah, Dizful, Shuster, and Behbehan would undoubtedly avail themselves freely of this outlet now so neglected and yet wanting so little to render it practicable.

Hitherto the Shah's Government has declined to assist in any way, or even to allow foreign steam vessels to run on the Karùn river. Messrs. Gray, Paul & Co. were willing and anxious to establish a regular service, but were met by the most extraordinary demands for port, river,

and navigation dues, which effectually nipped their schemes in the bud. It is not difficult to guess the fountain and origin of the opposition displayed, and I cannot but think that a little diplomatic pressure judiciously applied at Tehran at the right moment would overcome the short-sighted policy of the Persians. Her Majesty's Minister has, it is true, from time to time put forward representations on the subject, but so far without any satisfactory result. I may be allowed, perhaps, to remark that the Imperial Government, with its countless pressing questions to arrange all over the globe, cannot be expected to pay such attention to a matter of this kind as would the Government of India.

It will be readily understood that under no circumstances can access to the inland centres of trade in Persia be rendered smooth or easy. According to the authority of Captain, now Sir Oliver, St. John, the height of Tehran above the sea is some 4200 feet, of Ispahan 4700, Shiraz about the same, and so on; and to arrive at the general level of the interior, range after range of stony mountains has to be crossed by some means or other. Once on the higher levels there are stretches of country where light railways, or at least tramways, might be constructed and worked with advantage. But there is not nowadays, in my opinion, movement enough in Persia to call for any such works on an extended scale. Concessions for enterprises of this description have indeed from time to time been granted to European capitalists, but have invariably fallen through. At the Shah's request I sent out on one occasion an estimate for a light line between Tehran and Shah Abdul Azim, a much frequented place of pilgrimage five or six miles from the capital, but although the calculated cost was trifling, and this small start might have paved the way to greater efforts, nothing more was heard of the matter.

The Persian in authority (and indeed the Persian not in authority) is desperately fond of coin, not to spend, but to hoard. To him the idea of investing money with even the most assured prospect of large returns in the future is odious, and with rare exceptions the wealthy natives have no desire to improve the general condition of the country. Many of them visit Europe and appear to thoroughly appreciate and enjoy the numerous conveniences and luxuries of an advanced state of civilisation, but once back in their own land they endure with perfect contentment the primitive conditions of existence which have prevailed since the Deluge. At any rate little or no active help in the prosecution of a scheme such as I have endeavoured roughly to describe can be looked for from the Persians, but it is surely not too much to expect that the antagonism evinced by the Government of the Shah should be withdrawn. In this case British mercantile enterprise is ready as usual to push forward, but is forcibly and foolishly repelled.

During the autumn and winter of 1881–2, Mr. Baring and Captain Wells made together a series of interesting journeys in this little-visited south-western part of the Persian empire. After travelling from

Ispahan to Shuster, as mentioned just now, they proceeded to Shush and Dizful, and then marched to Ahwaz by Behbehan to Shiraz. Captain Wells has sent me his notes and his plane-table surveys of the several routes followed, which I have placed at the disposal of the Society, and which will I think prove of great utility to future travellers. It is curious to see how large and how numerous are the tracts in Persia still unexplored by Europeans. Most of them are no doubt either stretches of desert or masses of mountains. To travel off the beaten tracks is difficult and perhaps dangerous, but assuredly there are many parts of the country at present utterly unknown, which would well reward the intelligent and careful explorer. As an instance, I may refer to another short tour made by Captain Wells round Lake Nerís, but a few days' march from Shiraz, which resulted in the discovery of a kind of secondary sheet of water known to the natives as Lake Narghiz, which is not shown, I believe, on any of the published maps. The climate on the higher levels of Southern Persia during March, April, and even May is thoroughly delightful and invigorating, and the mountain slopes at that season are carpeted with the most brilliant flowers such as scarlet tulips and anemones, blue gentian, crocuses, and in fact every sort of bulb. As the summer's sun increases in strength they quickly fade away, and the most striking charm of the landscape disappears. In almost all parts of Persia wild goats and sheep abound on the more elevated peaks, but to follow them and bring them down requires a considerable amount of perseverance, activity, and strength on the part of the sportsman.

To return, however, to the immediate subject of this paper, I desire to point out that while every effort should in my humble opinion be made to assist in the construction of railways in Turkish Arabia, I am not very sanguine as to the success of such schemes in Persia. I shall not believe even in the much talked-of line from Resht to Tehran until it is open for traffic, though I must admit that in this case Russian pressure may achieve marvels, and there is no doubt that the country between Cazvin and the capital is well suited for such an undertaking. But while millions must be expended there, a few thousands would, I believe, work wonders if laid out on the simple little Karùn river proposal.

I have tried in these very incomplete remarks to show that the future welfare of Persia is deeply concerned in the encouragement and development of commerce through her southern ports, and surely the question is not without interest to Great Britain and India. Our trade and our influence in this part of the world are, I believe, receding, and unless action be taken to support and help within reasonable limits those who are quite prepared to press forward if allowed, Bushire, Bunder Abbas, and Shiraz may before many years have passed be the only parts of Persia where traces of British trade will linger.

The PRESIDENT, in introducing Colonel Champain, said that he had been for some years the Director-in-chief of the Indo-European Telegraph Department—an office in which he succeeded Sir Frederic Goldsmid. The paper would carry them through the highways and byways of a part of Persia very little known to Englishmen; and besides conveying a good deal of interesting geographical information, would open up commercial considerations in which this country was greatly interested.

After the paper—

General Sir FREDERIC GOLDSMID said he had very little to say on that particular part of Persia to which Colonel Champain had chiefly alluded; but he was able to corroborate the statements in the paper with regard to the roads through Persia. He had entered Persia from Tabriz, by Mashhad, from Sistan, from Bunder Abbas, from Bushire, and had passed out of the country two or three times by Kirman and Kirmanshah; so that he knew pretty well the state of the roads. Unfortunately he had not been by Shuster, Dizful, or the Karùn river. The subject of the paper was not, however, quite unknown to him. He studied it when it was referred to him three or four years ago, and had always thought it would be an admirable project if it could possibly be brought to perfection; but he had a much larger project in his own mind which, he thought, must at some future day be carried out, namely, a complete railway between England and India. That railway could never be completed unless it went through Persia; for it seemed to him out of the question that it should go through Russia and Afghanistan. Colonel Champain, in speaking of the route between Kirman and Ispahan, said he had not been there himself, but he (Sir Frederic Goldsmid) had been twice over that road and would have no objection to drive along it in a stage coach. That appeared to him to be the line of the future railway, and from Kirman to India he did not think there would be any great difficulty. The chief difficulty would be to get down to the coast; but that could be overcome by properly selecting the route. Once on the sea coast the whole way to Karachi (Kurrachee) was very plain. It appeared to him unfortunate that no one would contemplate a railway without looking at immediate profits. The connection of philanthropy with railways might be rather romantic and Quixotic, but he thought, in this case, that what now appeared a philanthropic enterprise would, in the course of years, prove a practical and remunerative one. If the only consideration were the profits to be obtained the first year after the completion of such a railway, it would never be formed. The Euphrates Valley Railway, in his opinion, was quite out of the question. However, he thought, the sooner attention was given to completing the communication on the west of Persia towards Tehran the better, because, failing the project of the great Indian railway, which could not be carried out for a great many years, nothing could be better than the proposed communication partly by water and partly by road, viâ Ahwaz to Ispahan and Tehran. He himself was employed for years on the question of the frontier between Afghanistan and Persia, and between Baluchistan and Persia. It had been a great happiness to him to know that however unsatisfactory the arrangements with the Afghans might be, those between the Baluchis and the Persians were so satisfactory that for more than ten years he had never heard of any dispute between them with respect to the frontier. He always regarded the settlement of the frontier not simply as a political question, but as something which would tend to give a sort of impetus to communication between India and Persia. In the absence of railways it would be well to improve the land communication between Kirman and Karachi, which would be a very simple task indeed. He hoped that attention would also be given to communication on the side of the Karùn river.

Mr. G. S. MACKENZIE said the present competitive trade routes between north

and south are:—From the north—1st, viâ Trebizond (a Turkish port in the Black Sea) to Tabriz; 2nd, viâ Poti (the Russian port), Tiflis, and Baku, to Tabriz and Tehran. From the south—1st, viâ Bushire (in the Persian Gulf) to Shiraz and Ispahan; 2nd, viâ Baghdad (a Turkish port) to Kirmanshah, Hamadan, and Tehran. The natural outlet for the commerce of the north was clearly through Russia, and any attempt to interfere in that direction with the monopoly of her carrying trade would, in his opinion, be useless. Russia has for years past been steadily improving her means of communication towards Persia and Central Asia, and, by her weighty influence at Tehran contrived that what few improvements have been made by Persia herself, should be directed towards the shores of the Caspian. When these shall have been well established, and the route through Turkey fallen into disuse, doubtless by the imposition of prohibitive dues, British manufactures will cease to be known in the markets supplied from the north, and the produce of Russian looms alone be found. There was, however, a point beyond which commerce from north or south could not be forced without strained efforts. A glance at the map would show that England ought to possess the means of commanding all trade south of a line roughly drawn along say Sihna, Hamadan, Kum, Yezd, Birjan, and so on, to Herat, and it would only be becoming on the part of a civilised nation to assist ungrudgingly in what is surely the interest of Persia herself, viz. the development of all her resources whether in the north or south.

Mr. Mackenzie then proceeded to describe, briefly, the roads passed over by him in 1875, on his journey from Ispahan to Mohammerah viâ Shuster, and back again three years later, from Mohammerah viâ Shuster to Ispahan. Shortly after his arrival at Bushire in 1866 his firm found it necessary to open agencies in Shiraz and Ispahan, the chief consuming districts supplied from Bushire. This necessitated his residence in the interior for a time, when the long and expensive land carriage from the coast was so prominently brought under his notice that he began to study the geography of the country. With Captain Selby's valuable report on the practicability of the navigation of the Karùn before him, it was evident that the shortest distance to Ispahan, as the crow flies, was from Shuster, but that route was unknown even at that late date. All his efforts to obtain information respecting it, from natives and Europeans alike, failed. No one had been across it from end to end. All he could learn was that the road was impracticable for caravans and dangerous for travellers, passing as it did through the heart of the country where the wild Bakhtiari tribe roam. Having already travelled considerably over the beaten tracks of the country and never once having been subjected to the slightest annoyance, he believed that if he respected prejudices and treated them with the courtesy due to one's host, he would find the Bakhtiari as free from caste prejudices, as courteous and kind to the stranger (even though he be a "Kafir") as according to his experience Persians generally are. He was not disappointed. He started towards the end of March 1875 with one personal attendant, a groom, and a cook (Persians); none of them carrying arms of any kind, and each having a horse, one to carry the baggage and a spare one led to relieve the others and in case of accidents. To Ardall, the fourth stage from Ispahan, there was no difficulty, the road to that point being much frequented and well known. Ardall is the summer quarters of the Bakhtiari tribe and principal residence of the Ilbeghi, the chief's deputy and brother. With him he hoped to make friends, and there obtain his guide. He found there the Ilbeghi and his three sons, who housed and entertained him most hospitably, and were most friendly. He told them frankly who he was, and the object of his journey. They, on the other hand, gave him details of the road, and a guide to the Ilkhani (the Chief) who fortunately was quite at the Shuster end of the district, the winter quarters of the tribe. With the Ilbeghi's man as guide and protector all

personal danger was at an end. Strict injunctions were given that he was to be treated as the chief's guest, all food and provender therefore was supplied free of charge at each village or encampment he halted at. It was with some difficulty he pursuaded his guide that he could not permit his presence to be a tax on those he stayed with, and would prefer paying fair market prices for everything, though equally grateful for their kindness. In due time he reached the Ilkhani's camp without mishap of any kind, and found him and his sons to be, if possible, even more friendly disposed than his brother.

Hassan Kuli Khan, whose authority over the whole Bakhtiari region was all but absolute, was in many respects a remarkable man. He (Mr. Mackenzie) subsequently had the pleasure of entertaining him at his house in Bussorah. His death, to which Colonel Champain had referred, was a blot on the Zil-i-Sultan's otherwise beneficent rule, and a great calamity for Persia. Of course he took away the usual orders for guns, pistols, and telescopes, and these he sent back as gifts in recognition of the hospitality and valuable assistance he received on his journey. This cemented a friendship which proved most valuable on his second trip. Although he had been now three years absent from Persia, he was in constant communication with these chiefs, who intrust him with various commissions, and although unaccompanied by remittance, in no case have they failed to send the money promptly to Bussorah in payment on receipt of the articles. Such is the confidence he had in them that should he ever again visit Ispahan he most certainly would take the Shuster route in preference to any other. He had no hesitation in saying that if one-half the labour and money which had been expended on the kotuls (or passes) on the Shiraz road had been applied to the Shuster route, there would be no doubt as to its being the more direct and easier way.

The several routes from Shuster then are:—1st. Shuster to Ispahan by Dopulan, the one he took on his first journey, mentioned by Captain Wells, 12 stages, or say 266 miles. 2nd. Viâ Bazuft, found to be the better and easier one, 14 stages (several short ones), 259 miles. Bushire to Ispahan viâ Shiraz, 23 stages, 460 miles. He was told by natives that the distances from Shuster were to Kirmanshah, 245 miles; to Hamadan viâ Burijend, 256; to Tehran viâ Burijend and Kum, 402 miles. On the subject of his second journey, he would venture to read some extracts from a letter of Colonel R. M. Smith, R.E., to Colonel Champain, dated Tehran, September 9th, 1878:—"It may be of interest to you to know the result of a journey which Mr. Mackenzie, of the firm of Messrs. Gray, Dawes, and Co., of London, Bushire, and Bussorah, has just made from Mohammera to Ispahan viâ Shuster. That gentleman made the same journey in the opposite direction by a different road in the year 1875. He is now in Teheran for a few days, where I have had the pleasure of meeting him and learning the following details of his recent journey.—He started from Mohammera on the 27th July in the river steamer *Karoon*, placed at his disposal by its owner, Sheikh Hajji Jabar Khan, Governor of Mohammera. Hajji Jabar, now an old man, is an Arab, but for many years has been the local Persian Governor of Mohammera, under the Governor-General of the province of Arabistan, who resides alternately at Shuster and Khoramabad; he engages largely in trade, and is now the possessor of a steam-launch and of the *Karoon*, a steamer of 120 tons, built expressly for him for river navigation by Messrs. Yarrow and Hedley, of Poplar, at a cost of 6000*l*. The *Karoon* plies at irregular times between Mohammera and Ahwaz, where, as you are aware, the continuous navigation is barred by the rapids at the ruins of the old Dam, or Band. To complete the navigation as far as Shuster it would be necessary to place another steamer above the Band to ply between Ahwaz and Shuster. This, Hajji Jabar told Mr. Mackenzie, he was prepared to do, if secured against the opposition of the Government

in Teheran, and supported by the co-operation and joint interest of Mr. Mackenzie himself and of the chief of the Bakhtiari, who controls the country between Shuster and Ispahan.—Starting from Mohammera at 12.30 P.M., the *Karoon*, in charge of her Arab captain, with Mr. Mackenzie on board, steamed uninterruptedly and without halt during the night to Ahwaz, which she reached in twenty-three hours, at 11.30 A.M. next day. During the voyage she never bumped or grounded. At the lowest season, the captain told Mr. Mackenzie, at no part of the river between Mohammera and Ahwaz was there ever less than three feet of water: a depth quite sufficient for steam navigation.—From Ahwaz Mr. Mackenzie marched with baggage mules and his own horses by regular caravan stages in sixteen days to Ispahan, viâ Shuster, Gotwend, Bazooft, and Chaharmahal. Although without guard of any kind, he met with nothing but civility the whole way. During eight days, viz. from the second stage out of Shuster to within four days of Ispahan, he passed through country both well watered and well wooded with fine timber trees, chiefly beach. A chenar tree, under which he passed a night, measured 35 feet in circumference. The villages of Gotwend, Chehlan, and Bazooft, in the neighbourhood of Shuster, were the only ones he passed before reaching Chaharmahal, two and a half days' march from Ispahan. There were no caravanserais, but everywhere the pasture was abundant; stocks of grain were seen in all the arable patches. At night numerous fires marked the positions of Eeliaut encampments in the hills. The air was pleasantly cool, and the mountain passes were on the whole less formidable than on the Bushire-Shiraz road. At no part of the road had the mules to be unladen to enable them to pass. The whole route from the gates of Shuster lay through the country of the Bakhtiaris, the most powerful and hitherto the most dreaded tribe in Persia. With the rule of the chief Eelkhani the villagers about Shuster and Chaharmahal all expressed themselves well contented, and told Mr. Mackenzie that nothing was exacted from them beyond their regular *maliyat*. He saw several unarmed caravans going to Khonsar and other places, evidently in perfect security. By the more southern road through Ardel, which he took in 1875, the Karoon has to be crossed at Godar Balatak on a raft, the animals swimming alongside. This difficulty is avoided on the Bazooft road, which is consequently more frequented by caravans. From Ahwaz to Ispahan, the mules, the first that presented themselves, were hired for four tomans each, or little more than half the usual rate from Bushire. The greatest height passed by Mr. Mackenzie, according to his aneroid, was about 9000 feet. During the months of January and February the snow at such places must be very deep, and the passage of caravans often impossible. At that season of the year, however, almost every road in Persia is liable to be blocked with snow. —Mr. Mackenzie appears, by means of open confidence in the good faith of the clan, to have acquired the friendship of the chief of the whole tribe, Hussein Kali Khan Eelkhani, as well as that of his sons and of his brother the Eelbeygi, whose authority over the whole Bakhtiari region is all but absolute, and who is in many respects a remarkable man. His habits of uncontrolled command, aided by a gigantic stature and an imposing presence, make him the *beau idéal* of an Eeliaut chief. His own tribe yields him implicit obedience, and many of the rival tribe of Kashgai have recently placed themselves under his powerful protection. His friendship to an Englishman is therefore a matter of more than personal importance, especially as his power is hereditary and independent of the fitful and precarious good-will of the central Government. His friendly relations with Mr. Mackenzie, if followed up by the establishment of a trade route through his country, might lead, through community of interests, to a marked increase of English political influence in Southern Persia. At Ispahan, Hussein Kali Khan, who happened to be there at the time, called on Mr. Mackenzie and expressed a strong desire to see the Mohammera-Shuster-

Ispahan route thoroughly opened to trade. He agreed to take a third share in the cost of the requisite steamers on the Karoon, provided Mr. Mackenzie had also an interest in and the management of them, and said he would himself furnish 100 mules, or as many as might be required, for the land transport between Shuster and Ispahan. He, moreover, gave Mr. Mackenzie a sealed paper to the effect that he, the Eelkhani, would hold himself personally responsible for the safety of the caravans, and would repay any losses by robbery between Shuster and Ispahan. Such an undertaking on his part is of great importance, as there is no doubt of his ability to fulfil it. In proof of his sincerity he offered to give to Mr. Mackenzie, then and there, the estimated amount of his share in the steamers.—The general result of Mr. Mackenzie's journey seems to me to show that there is no physical difficulty in opening up a trade route between Mohammera and the heart of Persia, and that the establishment of such a route would meet with the hearty support and co-operation of all the local authorities. The only real obstacle is the blind obstinacy of the Government in Teheran, whose opposition is doubtless due to their obsequience to Russia.—A concession, with a guarantee of 6 per cent., is, I understand, about to be granted for a costly railway from Teheran to Enzeli, from which Russia alone, and not even Persia, will reap any benefit. A railway from Tiflis to Teheran is also said to be under discussion. Unless, therefore, some corresponding amelioration of the southern routes is forced upon the Persian Government, Persia must eventually cease to be a field for English commerce, and become a close preserve for that of Russia. In the north, Russia has already many advantages in her favour, of which she is not slow to avail herself; but, on the other hand, England ought to predominate in the south. With weekly mail steamers from the Persian Gulf to India, and fortnightly ones to London, every facility is given for the development of English trade and influence which subsidies can provide. But something more is wanted, even if only to retain what has already been acquired. The telegraph, as you are aware, was successfully established in spite of the jealousy and opposition of the Persian authorities. Somewhat similar action might perhaps be advantageously applied to the navigation of the Karoon, for which neither public expenditure nor money guarantees, nor, in fact, anything beyond simple permission is wanted. Once fairly started, opposition would cease, and the opening-up of the country to unrestricted English enterprise would soon come—like the telegraph—to be generally recognised as a national benefit.—A light railway from Shuster to Ispahan might then become a feasible and paying undertaking, and the table-land once reached, extensions and branches in every direction might be cheaply and easily constructed. Such a railway would secure to a great extent the commercial and political interests of England, while, at the same time, it would be the only practicable one of any real value to Persia itself. All speculation on such subjects, however, is premature as long as the great natural highway of the Karoon is closed."

So much for the Karùn route. The route from Baghdad to Kirmanshah he would leave to be dealt with by those who are better acquainted with it. He would give a few facts respecting the river service on the Tigris, between Bussorah and Baghdad. In reply to Colonel Champain's objection to the dues levied at the Turkish custom-house on goods destined for Persia, he might mention that the duty, being only 1 per cent. for goods "in transit," is more than compensated by the increased water carriage, enabling goods to be placed at points beyond Kirmanshah, which could not be reached, on equal terms, if landed say at Shuster. So that even though the Karùn be opened to navigation, it in no way detracts from the importance of the Tigris to this country as a water-way. What is required there is that we should be allowed to run such number of steamers under the English flag as our extended ocean traffic demands. In 1862 the Turkish Government granted a

firman to an English firm at Baghdad to place two steamers on the river, and they are still restricted to that number. Notwithstanding the enormous development of trade since the opening of the Suez Canal in 1870, the means of carriage on the river Tigris is worse now than it was fifteen years ago. Midhat Pasha, when Governor of Baghdad, placed several Turkish steamers on the river, and altogether there was a wonderful impetus given to affairs while he ruled the Pashalik. After Midhat's removal, no money of course was expended on the steamers; they one by one dropped off, and the entire traffic must shortly fall on the two English steamers, if it has not done so already. In 1870, before the opening of the Canal, the entire trade of the Gulf was (excepting native dhows) carried on by a monthly steamer from Bombay, and three, or at most four, sailing ships a year from England. Now there are, in addition to a weekly mail steamer from Bombay, three native owned steamers running on the same line, and two lines of monthly direct steamers from London. A French line too has lately been started. Notwithstanding this increase, no step has been taken to improve the inland navigation or transport. In 1870 the freight on iron bars from London to Bushire was 67*s.* 6*d.* per ton, and in 1883 it is 30*s.* The freight from London to Poti or Trebizond is much the same, so that the competition between north and south comes to be one simply of cheap country carriage. In the present financial condition of the country he thought it was premature to talk of railways; but free navigation of rivers, roads, and tramways, *where* practicable, would in a short time work marvels. Once the Persian Government saw the advantages, he had no doubt they would, as in the case of the telegraph, feel themselves the necessity of progress.

Colonel C. E. Stewart said he had returned from Persia only about six weeks ago. Russian goods were undoubtedly beating English goods altogether out of the market in Northern Persia, but he thought that that was due to the enterprise of the Russians and the want of enterprise shown by Englishmen. The physical difficulties the Russians had to overcome were quite as great as those which Englishmen would have to surmount, but they had used very strong influence with the Persian Government, and had spent a great deal of money in making railways. The other day he travelled by railway from Baku on the Caspian to Tiflis, the capital of Georgia, and could have gone on to Poti, on the Black Sea. Another railway was being made from Tiflis to Batoum, and one was projected from Tiflis to the Persian territory on the Caspian near Tabriz. The Russian merchants were pushing forward their trade, but he did not think that Englishmen ought to fear any rivalry. If they only made an effort, and were assisted by their Government as the Russians had been, they would be able to undersell the Russians. He knew there was in England a jealousy of Russia, and perhaps what he was saying might be distasteful to some persons present at the meeting, but he could not help feeling that the Russians were doing a great deal for those countries. He was in Dereghez, on the Tekke-Turkoman border, two years ago. During his latest journey to Persia he had not revisited Dereghez, but had passed through the southern part of M. Lessar's route. He was living in Khaf when M. Lessar passed through there, but was not at home when that gentleman arrived. In those parts of Persia two years ago it was almost impossible to travel without an escort of fifty horsemen; but in consequence of the Russian action the slave trade had been stopped, and the people could now move about with the greatest pleasure and comfort, and trade could be safely carried on. Englishmen should not grudge Russia her possessions in Central Asia. Of course it might be in some ways unpleasant, but Central Asia could not be allowed to remain a barbarous desert merely because it would be disagreeable to have the Russians near India. Russia also acted very liberally in allowing English goods to go through from Poti to Baku and Persia free of duty. A committee, of which

the Grand Duke Michael was President, has lately strongly reported against any duty being imposed, which had been suggested by some Moscow merchants. It was said that it was not worth while for English merchants to take that road, because Russia might at any moment put a duty on their goods; but to the honour of Russia, it must be said that she had not yet done so, and English goods could now go to Persia by the Russian railroad without a penny duty. He hoped that the day would come when Russia and England would better understand each other and be more friendly. When he was in the neighbourhood of Mashhad, and also lower down by Birjand, and towards the borders of Sistan, he saw very large caravans of goods coming from Bunder Abbas by Kirman. Iron, a little copper, and a great deal of cotton goods made at Bombay came up to Birjand, and from there went to Herat. Russian goods could not as yet compete with English goods at Herat; but if the Trans-Caspian railway was continued as far as the Persian borders, he thought that even in Herat the English would be beaten out of the market unless they took some steps to improve their communication with Southern Persia, and no line of communication was more important than that of the Karùn river.

Mr. Russell Shaw said that three years ago he went to Baghdad for the purpose of examining into and reporting on a line of railway from Baghdad to the holy places —Kerbelai and Meshed Ali—on the right bank of the Euphrates to the south-west of Baghdad, with an extension from Baghdad to the Persian frontier on the north-east. His attention was drawn at the time to the Karùn river as being the most feasible entry into Persia for commercial purposes, as both sides of the river belong to that country, and the draft of water nearly up to Ahwaz was stated to be the same as the draft on the Tigris to Baghdad, that is, three feet six inches. All sea-borne foreign merchandise, other than Russian, imported into Persia to-day, enters either through the port of Bushire, or else through Khanakin, the frontier town on the road from Baghdad to Tehran. The goods are transshipped at Bussorah into the river steamers which ply to Baghdad, and thence by mules or camels into Persia. In Persia it is never a question whether the country would gain by the working of steamers and the cheapening of transport, but simply how much is to be paid at Tehran and elsewhere for a very doubtful privilege. The producing and consuming districts are all situated on the high table-land, which cannot be reached without passing summits of at least 7000 feet, unless maybe from the side of Baluchistan. This said Persian table-land may be compared to an island surrounded on all sides by plunderers, except to the north, where the Russian advance on the Attrek valley has made the frontier secure. But whether it is approached by way of the Karùn or by the road from Baghdad to Khanakin or from Resht, the difficulties of ascent for a railway will not be small, and from what he saw of Persia on his ride from Baghdad to Tehran and Resht, he did not think that any but very cheap lines would return any interest whatever for many years. From the description which Mr. Mackenzie had just given of the land route from Ahwaz on the Karùn to Ispahan, there does not seem to be any easy route into the interior from the terminus of the navigable portion of the river. In all Persia there is only one English firm, one or two Dutch and Swiss houses, and there ends the foreign commercial community. Colonel Stewart had referred to what the Russians have done on the northern Persian frontier; now Baku was taken by the Russians in 1806, and the railway connecting this great petroleum district and important town with the Black Sea will be opened in January 1883, that is, after seventy-seven years occupation! There is not a cart road in the neighbourhood of the town which can be dignified by that name; nevertheless, the Russians have done wonders in the east, and particularly for the northern frontier; but then they have laid their railways either on their own soil or on that of countries which sooner or later they intend to annex. General Goldsmid had

touched on a grand scheme for a railway from Constantinople through Tabriz, Tehran, Meshed, and Herat to India; others favour a line across Mesopotamia down the shores of the Persian Gulf; others the so-called Euphrates Valley. Now, even if any of these railways ran through an English dependency, or through countries with some sort of responsible government, their merits as immediately paying lines would not be apparent, and an imperial guarantee would most certainly be requisite in order to be able to raise the capital in England. But the granting of such a guarantee for a railway situated entirely in the possessions of various foreign powers appears entirely out of the question, and as railways cannot be made without money, the establishment of these means of communication, except in the north by the Russians, will, in all probability, be the work of many years unless some great change occurs in the political state of both Persia and Turkey. The projected railway from Baghdad to the holy places and the Persian frontier would open up Persia as well as the route proposed by the author of the paper, but as, in order to prevent foreign intervention, the Turkish Government expressly prohibits the sale of the concession except to Turkish subjects, the enterprise remains a dead letter, although the line would pay very well indeed, the country being perfectly flat and the traffic very great. The Ottoman Government like it to appear as if they were granting concessions to open up their country, but it is only to make believe, for if the concessions are given to Turks, subject entirely to Turkish laws, and if they cannot be transferred to Europeans, they are quite useless. It is, therefore, waste of time and money to try and promote extensive railway communications through such countries as Persia and the Ottoman Empire, unless such enterprises can be placed under the protection of those Governments whose subjects provide the funds. The distance to-day between the Russian and Indian railway systems on an air line is not over 500 miles. If the English and Indian Governments wish to promote trade with Persia the state railway now ending at Sibi should be extended to Quettah, and thence, avoiding Afghanistan, through Baluchistan to some convenient point on the Persian frontier; with Kurrachee (Karachi) as a commercial basis, and a depôt on the borders of Persia, English goods would defy competition. But is the game worth the candle?

The PRESIDENT, in moving a vote of thanks to Colonel Champain, said that the primary object of the Society was, undoubtedly, the study of geography pure and simple, and they pursued that object regardless of any commercial profit that might arise from it. Their profit was extended knowledge, and with that they were satisfied; but as Englishmen, "although they were on science bent they had a frugal mind," and were not at all sorry to see science point out profitable paths of commerce. He was gratified at the turn the discussion had taken. It was now evident that what had to be done in order to re-establish the position of England in Persia, was to compete with their powerful and active rival, Russia, in the peaceful paths of commercial enterprise. The discussion had showed how that competition might be carried on. Undoubtedly they must all wish that the magnificent scheme so vigorously sketched out by Sir Frederick Goldsmid should be carried into execution, but although Russia had made railways through her own territories or dependencies while England might be called upon to make them through foreign countries, it was news to him to hear that English capital had not been employed very largely in making railways in countries that were not dependencies. But in waiting for the execution of the larger scheme, he thought it had been clearly demonstrated that it was possible, at a very small cost, to get a route into the heart of that part of Persia where alone Englishmen could hope successfully to compete with Russians. The Shah of Persia visited England some years ago, and great expectations were formed of the effect which would be produced on his mind by the sights of British enterprise

and civilisation. Some feeble efforts had been made to obtain in Persia results somewhat similar to those seen in England, but he was afraid that day by day the memory of what the Shah saw here became weaker and weaker. But at any rate there was one institution which flourished in that country, namely the telegraph. The price paid by England for carrying the telegraph through Persia to Kurrachee was that a single wire should be laid and maintained by us for the use of Persia. That wire had been greatly used by the Persians. It was managed by them and had developed a great deal of intelligence, and it was quite possible that it might be the beginning of a commercial spirit, which among so clever and intellectually gifted a people would rapidly extend, if it only met with a little encouragement from their Government. What was wanted by England was not the material aid of Persia, but the withdrawal of that passive resistance which, in common with most Eastern rulers, she manifested on almost every occasion. It was clear that if she would offer no obstacles the route up the Karùn would very soon be made practicable; and he could not but think that if it were steadily pressed upon the Persian Government, the desired result would be obtained. At any rate it seemed to him that if Englishmen had many officials out there like Colonel Champain and Colonel Smith, and many men of active enterprise like Mr. Mackenzie, success would soon be secured; and he would not be at all surprised if that evening's discussion gave a very sensible impulse to a scheme of so much importance to British commerce and British influence in the East.

Surveying Tours in Southern Persia. By Captain H. L. Wells, R.E.*

Maps, p. 184.

1. *A Journey round Lake Nerís.*

On April 27th, 1881, I left Shiraz for Nerís, in company with Major R. S. Thompson, B.SC. Skirting the town on the north, we followed the ruined walls to the butchers' quarter on the east; leaving this, we turned north-east, past the Dil-Gusha (a garden), in which Malcolm was entertained, and the tomb of the poet Saadi, and entered the pass leading through barren mountains. Our way was rather steep and stony to the water-parting dividing the basins of the Shiraz and Nerís lakes, which is only some 10 miles from Shiraz; and as we had started late, it was thought best to make for the nearest halting-place, which was gained by turning about two miles off the road to the north; and there, nestled in the hills, we came on the picturesque little village of Baden. Our welcome was not hearty, as the village was inhabited by those most inhospitable and abominable of people, Seyuds, who informed us that no white man had ever strayed into their sanctum before. From Shiraz to Baden is 13 miles.

On the 28th we regained the road, which since the passage of the water-parting had followed the open ground sloping down to the Bandamir basin. Lake Nerís, however, was not yet visible. Some six miles from Baden we came on regular cultivation carried on by means of irrigation from wells. The people were inhabiting huts, unfortified and

* Communicated by Colonel J. U. Bateman Champain.

built up under the hills, but they are said to march away south with their tents in the winter. Gradually the sloping country became flat, the road led into the open, past the villages of Kushk-i-Mullah, leaving those of Daria and Dobeh on the right, and the plain of Merv-dasht was reached. At this season of the year it looked green and fertile, with numerous fortified villages dotted along in a line, showing the courses of the Bandamir river. About four miles further brought us to Khairabad, which, like all the rest of the villages in the plain, was fortified. Provisions seemed plentiful, fodder in abundance, firewood a little scarce. Our swash-buckler guides, of whom we had three, supplied by the Kawám-ul-Mulk, Governor of Shiraz, had to make a great fuss before they could get us eggs and milk. We pitched our tents outside the village, the head-man supplying guards for our baggage, to whom we paid half a kran each in the morning.

All this country is the property of the Kawám-ul-Mulk aforesaid, and one of his agents was here, about to start on a tax-gathering expedition to the Iliyáts, or nomads, large encampments of whom were to be seen to the east, their black tents showing out well against the green pasture. Perhaps this agent may have known something of the country he was going through, but certainly the men supplied us as guides knew absolutely nothing, and I believe none of them had ever travelled the road before. Our road, which to Khairabad had been due east, now turned south by east; from Baden to Khairabad 19 miles.

April 29th.—Our road lay south by east along the lower slopes of the hills that bound the Nerís Lake basin on this side. The Iliyát tents are pitched in lines, and from a distance look like companies of troops drawn up in battle array, with supports and reserves in due order. Leaving the low pasture-lands, on which they stand, to the left, we proceed over undulating barren land, with a slight slope towards the lake which was seen stretching away to the south-east. We came on some nomads tending camels and digging for truffles, which are evidently plentiful here, for the lads had their smock skirts full of them, and gave us some for nothing. After 16 or 17 miles we reached Kerameh, perched on a slight eminence with gardens below, in which are almond and fig-trees. It is watered by a good stream, which above the village turns a mill. The village goes shares in the water supply with another named Sigilabad, which is about two miles nearer the lake. The road travelled along to-day and yesterday was fit for wheeled traffic, and from Shiraz for guns. All supplies at Kerameh are plentiful. The villagers, a stalwart race of independent-looking fellows, have nothing to do with the dwellers in tents.

April 30th.—We descended both towards the lake and along the slope of the hills. The land on both sides showed marks of ancient cultivation, with ruined wells, but is evidently not touched nowadays.

At Hallalabad is a caravanserai built in mud; it was occupied by

Iliyáts. Shortly after passing it the road comes to near the margin of the lake, having to round the lower slopes of the Geloger, and to cross a brackish stream that flows from its foot; this spot is known as Pul-i-Talkh, or "Bitter Bridge." It is said to be a resort of robbers; four men with guns were seen hereabouts by our caravan, which was preceding us, and they caused the servants much anxiety, especially as Sultan, the guide and escort, an awful coward, announced that the ground was too rough to manœuvre his horse, and that therefore he could not get at the "sons of burnt fathers" and utterly demolish them, as he otherwise would have done. The four men probably thought the caravan too numerous, or saw us coming up in the distance, and so loafed by like peaceable people, and salaamed to us as we passed. Opposite the mountain the lake narrows, and a rocky island juts up in its centre. The view looking back is very fine: the upper waters of the lake, blue like the sea; the plain of Merv-dasht, with mountains on both sides; and in the distance the Kuh-i-bamu, visible north of Shiraz. All this is lost to view when, on rounding the foot of the mountains, the lower stretch of the lake comes into view, bending far away towards Nerís, with a high range of mountains, wooded on their slopes, reaching down to the lake on the right, and barren hills of rounded shape coming right down to the water on the north shore. The view is very beautiful, especially with the varied changes of blue to be seen in the water, and the unwonted sight for Persia, of almost a forest of trees. As we entered the wood it proved to be of low pistachio-nut trees, which were just covered with unripe fruit. The flies from these trees immediately attacked us and our horses, and made the remainder of our day's march unpleasant. I believe that later in the season these woods are almost dangerous for horses, on account of a large and venomous fly which worried ours terribly. At Geloger there is nothing but a deep pond of muddy rain-water; its depth was proved by one of the mules, on which sat the man carrying my plane-table, going headlong in, in its eagerness to get at the sweet water, and having to swim for it. The plane-table, thanks to its leather case, was little damaged. The mountain above this spot still had snow on its summit.

From the muddy pond to our halting-place at Khan-i-khet was three miles of gentle descent, to where a defensible tower and an old imamzadeh stood near the banks of a stream of brackish water, on a level almost with the lake but two miles from its slimy margin. There are no permanent habitations here, but the tower and a shed beside it are occupied by the people who come from Khir to cultivate the few fields that are watered by the brackish stream.

We walked down to the lake for a bath, but found it impossible to get into water above our knees, though we trudged away for at least a quarter of a mile. Large flocks of flamingoes were flying to and fro, and a large species of duck, black and white in colour. The shore of the

lake had an unpleasant soapy, saline smell, when the mud was stirred. The route we travelled along to-day is well adapted for wheeled traffic, but there are no supplies to speak of except firewood; water bad, but drinkable; distance, 18 miles.

May 1st.—Leaving the vile spot, Khan-i-khet, our road ran through the woods that fringe the south-by-west shores of the lake.

After five miles the dry bed of a torrent was passed, and soon the pistachio-trees thinned out and disappeared; fine streams of clear water were crossed, but they were all brackish to within half a mile of Khir, where we suddenly came upon a sweet spring.

In the neighbourhood of Khir there is a considerable amount of cultivation of wheat and opium, and some good gardens of fruit-trees are scattered over the plain, which here juts out into the lake in the form of a promontory. From Khan-i-khet it is 19 miles to Khir.

May 2nd.—From Khir, through cultivated ground for three miles, we were glad to quit a place which is more infested with flies than even Delhi or an Indian bazaar. Beyond the cultivated district are stony, sterile, mountain slopes, leading right down to the lake. Looking back, the pass (through which the road leading to Shiraz viâ Pul-i-fasa makes its way through the mountains) is to be seen. The distances by it, and the way we came, are very nearly equal. At 15 miles from Khir the end of the lake is reached, where it dies out in white ooze. A good stream of fresh water flows into it here, and beyond it a plain, for the most part cultivated, leads right up to Nerís, the village of Rozak being passed on the left hand. The plain is rendered more remarkable by numerous rocky islands (as they may be termed) that rise out of it; and behind a promontory of these, inclosed on the other two sides by mountains, is the picturesque little town of Nerís, with its gardens and large walnut-trees, looking bright above the sea of poppy-heads which form the foreground of the picture. From Khir it is 24 miles to Nerís of flat, easy road.

We halted May the 3rd, having been well housed by the local governor, who sent us presents of fruit and yellow and red roses; he also came to see us, and took us over his own house, where there were some very fine orange-trees. The people were exceedingly civil, and women came with all sorts of strange disorders, asking for remedies. There is a manufactory of rough pottery here, from kaolin found in the mountains about four miles off; the articles are very highly glazed.

May 4th.—The heat is becoming excessive. We leave Nerís on our return journey, and soon hit off the north-east corner of the lake, and turning to the right across a low range of hills look down on a bare and uncultivated plain, with ruins of fortified villages dotted about. This is called Dasht-i-khak.

The kanats, or irrigation channels, that formerly supplied these habitations with water, have fallen in, or failed, and the whole of the people have abandoned the district. We had to halt under the hills at

a small spring, otherwise we should have been without water. The geological features of the country are very peculiar. The hills we had just crossed were of conglomerate, broken through by a vein of white stone somewhat similar to quartz, but friable. On the north-west side of the hill the rocks are so strongly impregnated with iron that it is impossible to use the compass, a lump the size of an egg leading the needle in any direction. Wild rhubarb, of the sort used for cooking in England, is very plentiful on the hills. We had some nineteen miles of good easy country, but most of it had no track or road to guide our march.

May 5th.—From above Dasht-i-khak we crossed the plain and saw where it leads down to the lake at a sort of bay. Then, crossing a slight water-parting, we found that we were in a basin draining to the west, and in the distance saw a large expanse of blue water; as we approached this proved to be a lake, stretching away to the west.

The ironstone had now disappeared from the hills; the plain to the north-west was bounded by lofty mountains, which are named Roshan-Kuh, and at the foot of one of them was a deep green patch which is said to be a clump of myrtle, and hence the name of a village hard by, viz. Deh-Murt. The road leads over a perfectly level plain to Khush-khak. Signs of old habitations were to be seen; but all was now waste, except a few cornfields irrigated by the stream that waters Deh-Murt. Distance traversed, 27 miles.

May 6th.—Khushkhak has ceased to exist as a village; there are only some ruins remaining. The watercourses, however, were utilised by a large encampment of nomads, who were here cultivating poppy, large flourishing fields of which lead down to the newly discovered lake, which here goes by the name of Lake Nargis, or the Lake of the Narcissus. A narrow channel was pointed out to us, its opening almost hidden by a small stone or rock, and this is said to be connected with the bay of Lake Neris that runs into the north shore opposite Geloger.

From Khushkhak fine pasturage is found along the side of the lake right away to Tasht, a small village situated at the head of a bay where there are groves of wild myrtle as much as 18 feet high. There were Iliyát encampments between Khushkhak and Tasht and a ruinous village named Abadeh, around which there was some opium cultivation. The villagers complained bitterly of the treatment they received at the hands of the Iliyáts. From Abadeh a road leads to Kawám Ali, a village apparently of considerable size, and from thence it is said to cross a kotul between Kuh-i-Khan and Roshan-Kuh, and to lead to Shahr-i-Babek.

Our camp was pitched at the head of the pretty bay of Tasht. The foreground of deep grass and reeds, the intense blue of the water of the shallow lagoon, the bold headland of Meshi in the middle distance, and the many islands or rocks scattered about in the blue distance, made up

as lovely a picture as it has been my fortune to see, in Persia, at all events.

May 7th.—Our way lay through and up a deep gorge, turning the end of Kuh-i-Khan. From the top of the gorge the junction of the Lake Tasht with Lake Nerís was manifest. The road again descended to a pretty bay of the lake. The limestone rocks looked just such as the ancient Persians delighted to carve; the situation too looked most likely for antiquities, but alas, we saw no signs of inscriptions or bas-reliefs; there was, however, near the margin of the lake a raised rampart in the form of a ravelin, jutting out from the low-lying rocky hills; its antiquity was shown by the size of a tree that somehow found nourishment amongst the limestone rubble of which it was composed. The crest of the parapet, so to speak, must have been at least 20 feet above the surrounding country. Tradition says this was a fire-temple; certainly it is ill situated for a fort, and is not required as a breakwater. That a great amount of labour was expended in its construction is certain; the fact of the point of the angle being towards the west and the calm scenery of the lake being very impressive, perhaps tend to the supposition that this was an old holding of fire-worshippers.

After some more up-hill work as our road left the lake, we gradually descended into the offshoot of the Merv-dasht which stretches up to Arsinjan. This valley has very steep sides on the east, is tolerably thickly populated, and is all under cultivation. We encamped at a village named Jemalabad, where our advent caused considerable excitement, as we were in a country never before visited by Europeans, though the roads from Shiraz to Nerís had been travelled by Captain (now Sir Oliver) St. John and Captain (now Colonel) Lovett.

May 8th.—From Jemalabad we followed the plain to its junction with the Merv-dasht. The muleteers were trying their best to take our baggage by a short cut, viâ Kafrad to Persepolis, but luckily their design was discovered in time to catch them up and change their course to the south, and our determination on this point was well rewarded, for on rounding the end of the Persepolis range, which is here lost in the plain, we came on some very curious remains. First we saw a remarkable hewn stone, 9 inches by 12 inches (width of ends), and depth 2 feet 6 inches; it was standing 6 feet 4 inches perpendicular out of the ground. This was pointed out to us as the heel-peg to which Ali fastened his horse, whilst 300 yards off a huge boulder with a hole in it served for the fastening of the head-stall of the gigantic quadruped. As we got further round the point we came on a very remarkable rock cutting, and decided at once to halt for the day and explore thoroughly the neighbourhood of Kadam-gah, as this place is called from the curious marks in the rocks, which are said to be the foot-prints of Ali's horse. An account of my investigations, with plans and descriptions of Kadam-gah, has been communicated to Sir Henry Rawlinson, and the plans

are lithographed on the margin of the map accompanying this paper (p. 184).

May 9th.—A hot march from Kadam-gah along the south slope of the Persepolis range to Chatak, where there is a village, cultivation, and sweet water; we had passed many salt springs between Kadam-gah and this place. From Chatak we still skirted the limestone hills and came on some Sassanian sepulchres cut in the face of the rock some 15 feet above the level of the plain. These rejoiced our eyes, as they told of Persepolis near at hand, and at length we reached the palace of Xerxes after a march of 20 miles in all.

2. *From Ispahan to Shuster.*

November 4th.—Djulfa to Pul-i-wargan, level road, 10 *miles. W. by S.*—In company with Mr. W. Baring, First Secretary to the British Legation at Tehran, I left Ispahan for the purpose of exploring the road through the Bakhtiari country to Shuster, thence to visit Dizful and Shush, returning viâ Ahwaz, Mohammerah, and Bushire, to Shiraz.

Our first stage was advisedly a short one. Leaving Ispahan we followed a road to the west by south to a point where it crossed the Zendarud river, by a brick bridge, at the village of Pul-i-wargan. Here we decided to halt, though we had only come 10 miles of level road, as the start had been late.

Our caravan consisted of, properly, twelve mules and four chavadars or muleteers, but we observed that a thirteenth mule had been added, and that a small boy formed one of the party. Four donkeys, too, were added for the benefit of the chavadars. Mr. Baring and I had a couple of horses each, a spare pony for my mirza, and a nag for Baring's personal attendant made up our stud. We had two useless guides who did not know the way. The rest of our servants were mounted on the mules, and comprised a cook, two grooms, two general servants, and an Armenian boy named Yusuf, whose business was to carry my plane-table, and who was supposed always to be at my elbow. He managed always to be a quarter of a mile behind, and always to do the wrong thing, like a true Armenian.

5th.—Pul-i-wargan to Chirmini, $25\frac{3}{8}$ *miles, good road. First* 10 *miles S. W. by S., after that S. W.*—The road lay through rice-fields over which large flocks of pigeons and ducks were flying. We had perpetually to cross irrigation channels of water led from the Zendarud. Villages were plentiful, and the people busy winnowing their rice. Ten miles from Pul-i-wargan we left the rice-grounds, and commenced the ascent of an easy slope past a village Bagh-i-wasch, so named from an old inclosed hunting-ground of Shah Abbas, remains of the walls of which are still to be seen. Two miles of slope, and we enter the small pass named Gerdineh Govpyseh, at the entrance to which is a dirty little hut used as a custom-house. From it a road goes north to Nejifabad which is distant 12 miles. Govpyseh is so called from marks on the hills supposed to resemble a cow. Five miles from the pass by a gentle slope we again reach the river which has made a great bend. It is here flowing east to west, whilst at Pul-i-wargan it was south-east to north-west. The Govpyseh range had to be thus turned. It divides Upper Lenjan from Lower Lenjan. Unlike Lower Lenjan, where the rice-fields are of wide extent, the Upper is a valley of 300 yards in width with high banks. All beyond these banks is desert, between them are rich well-cultivated rice-fields. Villages are very thickly scattered along the banks. The contrast from the desert above to this fertile strip with its plane-trees, dark-coloured bushes, rich yellow rice crop, and the sound of its

many waters, was very striking. The villages contain numbers of pigeon-towers like gigantic pepper-boxes: unlike those of Ispahan they are cylindrical and tall, and but for the cylinders being so close to one another that they impinge, a row of them looks very like a row of smelting furnaces.

At Pul-i-kala the road crosses the rapid river which is everywhere fordable, but the watercourses leading to rice-fields are difficult to pass. The bridge consists of eight arches, one of which has fallen in and is replaced by a most rickety arrangement of piles. The right bank is worse even than the left. From this point a slight ascent brought us to the village of Chirmini, where we halted. Distance from Pul-i-wargan 25⅜ miles.

6*th.—Chirmini to Qahu-i-rukh*, 17 *miles, rough road, with bad kotul*, 9 *miles W. by S. Then* 8 *miles S. by W.*—Chirmini consists of about 100 houses. The headman or khan housed us well and was exceedingly friendly.

On quitting we began to ascend the slopes of the hills which bound the right bank of the Zendarud; at the village of Liabeed a steep zigzag commences, quite impassable for guns, as it nears the top of the kotul named Tang-i-rukh. This pass over the hills, 6850 feet high, is known as the Gerdan-i-rukh or Pass of Rukh. The ascent took us three-quarters of an hour; the view from the top is over desert and rough hummocky ground to the north and north-east; the stream of the Zendarud being scarcely visible. The descent on the south-west is easy, and eight miles further on is the village of Qahu-i-rukh, the first of the district of Chahar-mahal, and under the jurisdiction of the Ilkhani or chief of the Bakhtiaris.

7*th.—Qahu-i-rukh to Shelamzar*, 25 *miles. No difficulties, level road across Chahar-mahal, then slight descent to Shelamzar; one bad ridge, but this could be turned.*—Qahu-i-rukh has about 300 inhabitants, and is in appearance very like an Afghan village; in fact this Chahar-mahal country is very like portions of Pishin. There seems to be plenty of water, villages are numerous and large, and the plain is all under cultivation. We counted six large and two small villages. Our road to-day lay along an extensive plain extending for many miles to the north, but closed by high hills to the south-east. At the western extremity of the plain is the village of Tor-koor (alt. 6750 feet); here the people were crushing a sort of vetch on their threshing-floors for winter's use. Leaving Tor-koor the road turns south-east down a gradually narrowing valley bounded on the east by sandhills and on the west by the mountain of Jehan-bin,* which is a fine mass of rock. At Shamsabad is a small walled village; the valley is seen to be occupied by a stream, and in this neighbourhood is one of the most elevated of the sources of the Karùn river.

The stream at Shamsabad (alt. 6743 feet) is 10 feet broad and three feet deep at ordinary times; it is bridged between the mountain Jehan-bin and Zangum by a new bridge of 10 arches of six feet span, showing that a good amount of water-way has to be allowed in time of flood. The road follows the river through a narrow valley. The sides of the mountains are scratched for sowing. The valley opens out below the village of Herajeh, where there is a rough stone bridge by which the road returns to the left bank, and skirting the hills for a few miles, having left the stream, a sharp ridge of rock, some 300 feet in elevation, has to be crossed before the valley and the village of Shelamzar are reached. This ridge could be turned.

There is a stream flowing past Shelamzar which joins the one from Shamsabad and the two combined flow north-west for a short distance before piercing the mountains surrounding the plateau of Ardall. Height of Shelamzar 6743 feet.

8*th.—Shelamzar to Ardall*, 19½ *miles. Very bad; difficult pass of Zereh;*

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* "Jehan-bin" means "a sight of the world," i.e. that the mountain is so elevated that a view of the world can be obtained from the top of it.

first 5 *miles S., remainder S.W.*—Leaving Shelamzar we went straight to the mountains to the south, and in a very heavy snowstorm and a bitter cold wind crossed the Gerdan-i-Zerre (alt. 9300 feet), a rough and very steep track only passable for mules, and blocked even for them in winter. The descent on the south side is not difficult, and two small lakes are seen on the left, covered with gulls and wild-fowl. One lake is named Albolaki, and a stream from it waters the village of Nagun, where the Ilkhani has a house. From near this lake the road follows the direction of the ridge it has crossed, and the steep way is between that ridge and one of the offshoot hills that runs parallel to it. The open plateau of Ardall is thus reached by a stiff descent, and the view from above is a striking one.* The configuration of the ground is very remarkable. To the south-east is a mighty mountain, the Kuh-i-kalah, with perpetual snow, having, I believe, an elevation of 12,000 or 14,000 feet. Between it and the Kuh-i-sabz range is the Tang-i-siah: from south-east to north-west flows the second tributary that the Karùn gains on its left bank. To the south-west is the mighty mass of Mount Gerreh, which must be over 14,000 feet in height. Between this last and Kuh-i-sabz the Karùn escapes from the valley of Ardall through the tang or gorge of Dopulan. Turning one's back to Tang-i-siah and looking north-west, one sees the valley of the Karùn proper, with the mountain Zerre, which is said to be higher than either Gerreh or Kalah. Between Mounts Zerre and Gerreh is a high range named Kuh-i-dinar.† Looking north is the comparatively insignificant range crossed by the Gerdan-i-Zerre, and through it is seen to break the river from Shamsabad and Chahar-mahal and it joins the Karùn here in the plain of Ardall.

I hope by the above description to give some idea of the Alpine scenery that surrounds the fastnesses of the Bakhtiaris. The Karùn at Ardall goes by the name of the Kuh-i-rung river, from its flowing from a hill of peculiar-coloured earth which they say gives a tinge to the water, though when I first saw it at Dopulan the stream was perfectly clear. Doubtless, however, this name of Kuh-i-rung is the origin of the name Karùn. At Ardall, Reza Kuli Khan, the second in command, so to speak, of the Bakhtiaris, has his headquarters, and has built a double-storied sort of barrack, the roof of which is ornamented with enormous ibex horns. The Ilkhani's house is at a village named Nagun, from which a magnificent view of the valley is obtained. Water is brought to it by artificial channels from the lake Albolaki. The Ilkhani's hot-weather quarters at Chakahor we did not see; but they have been visited and described by Englishmen already.

9th.—We are still in Ardall plain; the plateau of Ardall is devoid of trees, though the lower spurs of the Kuh-i-sabz are covered with oaks. The level part of the plateau showed marks of cultivation, but now of course was deserted, as all the Iliyáts had marched south for the winter. The huts clustered under the hills looked dismal and deserted. The snow-fall here in winter is described as tremendous.

10th.—Ardall to Dopulan, 7 miles. Very bad road, at one place a descent of 1000 *feet almost precipitous; remainder,* 4 *miles, along river, very bad. S.—*

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* From Ardall there is a road to Dizful viâ Bazuft; it is the same distance to the plains by it as by the one we follow, but far more difficult in winter, owing to the high elevation it crosses. In fact, it is said to be impassable at that season. Bakhtiari nomads doubtless follow it in their migration, but this I think is because it leads more directly to the green plains near Dizful, and that by it no passage of the Karùn is required, as it keeps to the north-west of the river. The road was shown to me at Ardall going rather north of east. The stages are given by Mr. Mackenzie.

† Not the Kuh-i-dinar, said to be 19,000 feet, visited by Captain Durand. That is in the Kashgai country.

We left Ardall, where Abbas Kuli Khan, son of Reza Kuli Khan, had hospitably received us. Crossing the plateau of Ardall to the south we descended into the deep-cut gorge of the Tang-i-siah river, which flows at a depth of 1000 feet below the plateau, and lies between perpendicular cliffs of fine limestone and conglomerate. At the foot of the cliffs, and wherever there is holding ground, oaks, ash, and pistachios are plentiful. A vine with leaves like a grape vine, but fruit like the elderberry, climbs over the rocks. Wild almond, clematis, and willow, as well as planes are common. After winding about for some two miles at the bottom of the gorge, we reach the picturesquely situated village of Dopulan,* on the left bank of the river.

Just below Dopulan the river of the Tang-i-siah falls into the Kuh-i-rung, forming as before stated the second tributary on its left bank. The former is spanned by a wicker bridge, the latter by one of brick lately built by the Ilkhani, at the point where the river emerges from a deep gloomy gorge. The bridge is narrow but serviceable, and spans the stream in one large and one small arch, length say 20 yards.

11*th.*—*Dopulan to Hilisat*, 19 *miles. Rough road and trying from frequent ascents and descents. First S., then* 5 *miles S.E.*—Leaving Dopulan—where, by the way, the people seemed wretchedly poor, and supplies, except firewood, were very scarce—we cross first the wicker and then the brick bridge, and ascend the side of the mountain, which is a north-west spur of Mount Gerreh. Our road was rough in places, though as a rule good, and led through thickish oak forest with a steady ascent to an elevation of 7850 feet, where we crossed the water-parting, a saddle-back between the Gerreh and Arman mountains, and descended by a steep track to some cultivated ground. The forest here is of oaks 40 feet high and 1½ yard girth (alt. 6350 feet). From the patch of cultivation the descent is through a narrow gorge with precipitous sides. The road is rocky, and goes downwards, but only to again rise steeply to 6600 feet, to again descend to 6400 feet, when it once more rises to 6750 feet, then crossing the saddle of a spur from the Arman mountain it descends into a gorge which leads down into the valley of the Hilisat stream (alt. here 5000), which we followed to where the Ilkhani's camp was pitched on the left bank (alt. 4850 feet).

The Hilisat stream reminded me of Cashmere, with its little terraces of rice-fields on either side, its fine plane-trees and the forest-clad mountains rising steep from the valley.

12*th.*—*Hilisat to Rudbar river*, 15 *miles. Not difficult till about Rudbar river, where a precipitous bluff has to be descended. W. by S.*—At 8.30 we left camp, accompanied by two retainers charged to see to our being properly treated whilst in the Bakhtiari country, and well they executed their duty.

From Hilisat a steep mountain is ascended (alt. 6900 feet), another offshoot from the mighty Gerreh. It has to be crossed, and its southern slope descended to the valley of the Rudbar stream. The top of this offshoot was rolling country, covered with fine oaks; the road good and open. Here and there the nomads were tilling the ground under the forest trees, or shaking down the acorns which they pound and mix with flour to eke out their bread. The springs were brackish. The view looking south and west was very fine. On the left was the Karùn deep down in precipitous gorges; with here and there tributaries flowing into it from the west from the Kashgai country, which showed more open vales than the one we were in. Far away north-west is a snow-capped mountain, which it seems to me must be the Kuh-i-dinar of the Kashgais. Looking south, the Kuh-i-mangasht, with its long

* "Two Bridge Place." Altitude 4950 feet.

ridge snow-capped and rugged, shows as yet no way out for us to the plains. On the right is Gerreh, with its massive head frowning on the Rudbar, which flows along its southern base. A few miles further, and we are on the top of the almost precipitous cliff that forms the left bank of the Rudbar stream. Here the view is very extraordinary. The ridge or cliff on which we stand (alt. 6725 feet) is of grey limestone, which is set off by buff-coloured dead grass and a peculiar kind of thistle, which fills every corner where the rock does not come to the surface, giving the appearance of a buff plush carpet crumpled over the irregularities of the mountain side.

The descent into the Rudbar valley was fearfully rough, nothing but mules and carefully-led Persian horses could accomplish it without accident; it is quite as bad as the Kamàrij Kotul on the Bushire road, but fully twice as long. A road here would indeed be difficult, and for wheel traffic impossible. It remains to be seen whether such a road could be made further up the Rudbar at Shaleel, where there is said to be a bridge. The Rudbar was easily fordable 150 yards in width and 2½ feet deep; it is a rapid and picturesque stream. We encamped on its banks. (Alt. about 3080 feet.)

13*th.*—*Rudbar river to Deh-i-diz*, 12 *miles. W. Very difficult ascent, but descent into Deh-i-diz easy.*—Our road lay up between the marl masses, and was rough, steep, and slippery. We avoided the Shaleel road, which must be better than the one we traversed, as Mr. Mackenzie, who followed it, writes thus:—"Shaleel to Deh-i-diz, altitude about 5150 feet, easy and gradual descent to a main feeder of the Karùn at about 3250 feet, crossed by a wicker bridge across a fissure in the rocks; dangerous crossing for animals; old bridge above in ruins; thence ascend to 5850." *

Now, although Mr. Mackenzie's description of roads is for the most part too *couleur de rose*, still evidently the route viâ Shaleel is the beaten track, and is much better than the one we took viâ Rudbar. On the high ground (alt. 6400 feet) the road is good, and descends by an easy gradient to Deh-i-diz (alt. 5221 feet). At Deh-i-diz there is an old fort, roughly built of unhewn stone with mortar. Around are nomad huts and a few houses of poor people. A large open upland is in front of the village, dotted as usual with oaks and patches of cultivation. A party of Seyuds were here awaiting to welcome the Ilkhani, who was to arrive the next day. They were by no means friendly, and expressed a desire to shoot us in the hearing of my Mirza, who showed much pluck, and seizing one threatened to report him to the Ilkhani on his arrival. The ordinary people were friendly enough.

14*th.*—*Deh-i-diz to God-i-Balutak*, 10½ *miles. Easy road descending the whole way. W.*—From Deh-i-diz we descended steadily down a watercourse to the banks of the Karùn, a distance of three farsakhs through wooded country. The guides had preceded us and got a raft of inflated skins ready to ferry our baggage across. The river here (alt. 2480 feet) was deep, and flowing say five miles an hour, and at this season 40 yards in width. Its banks showed marks of a rise of 10 or 12 feet during spring floods, when the width would be 60 yards.

Down stream are the ruins of an old bridge, according to Schindler's notes. We did not see them, but heard of them. It would not be difficult to rebuild this bridge.

Our horses and baggage animals had to be unloaded and their saddles taken off, and then swam across. This situation of God-i-Balutak is admirably adapted for a flying bridge, and there is nothing to prevent the working of such a bridge if a good stout

* This must be the bridge mentioned by Schindler as "above the present Pul-i-Amaret," and the Rudbar must be his Bazuft river, *vide* "Notes on a Journey in South-West Persia, 1877–8," R. A. Society Papers for 1880, p. 14.

boat were built for the purpose. Laden mules could then make the passage in a few minutes. The left bank requires a road made to the water's edge, as it is precipitous for a height of 50 feet. Our thirteen mules with ten men and three horses took one and a half hour crossing.

15*th.*—*God-i-Balutak to Mal-i-mir*, 24 *miles. Road capable of improvement, but would be costly. W. by N.*—Left camp 7.15 A.M. and did not get into camp on the "Tepe" on the Mal-i-mir plain till 5.30 P.M. The road rises gently from the river bank and is good; it makes for a gorge, and passes through it, following a valley between the south-east end of the Mangasht range and an outlying spur of that mountain; the Karùn river bed is here left for good. The road soon descends again, and is rough for four miles to where it enters a watercourse leading down to the Karùn. It ascends the watercourse, which is now nearly dry, though pools in it contain fish nine inches in length. The course is little better than a cleft in the grey cherty compressed clay rocks, which are here almost vertical.

Some way up this gorge a side gulch is followed to the left, and a curious old paved way, the Rah-i-sultani, leads to the open plain above (alt. 3880 feet). Then a very difficult piece of road is encountered, as a descent has to be made over the face of a limestone hill rounded in form, and to all appearance smooth until reached, when the terrible rifts and rubble stones that break up its surface prove to form one of the worst bits of road we have yet encountered. A way would have to be built up this face, and for wheel traffic this would cost a large sum of money. There is no avoiding this hill nor any of the gorges we have traversed to-day. The Mal-i-mir plain once reached, all is easy to the "Tepe." The altitude of the plain is 2930 feet.

Whilst we were on the Mal-i-mir plain I was met by Sultan Khan, cousin of the Ilkhani, a fine-looking pleasant fellow, who took me across to his tents pitched on the site of some ancient sculptures on the north side of the plain. One huge block of stone stands 40 yards from the foot of the hill, and near a break in the strata, forming a sort of bay or depression in the rock; on it, in life size, is in low relief the image of an ancient Persian in the act of supplication, standing. Behind him are tiers of small figures backing him up. The relief is so low, and the rock so grey, that the figures cannot be seen, unless caught in the right light and at the right distance. In the bay another block has rows of small figures in tiers as in Egyptian sculptures, the third block has a single figure. Further up into the bay and on the left-hand side as you face its end, cut in the side of the rocky hill, is a tablet with figures in bas-relief. It is about 2 feet 6 inches square. On it appears the figure of a man evidently offering up a sacrifice, as before him is a pile of three sheep without heads. Underneath him are smaller figures leading fresh victims. The background of the figures is covered with cuneiform inscriptions. I saw on this tablet written in pencil, the names A. Layard, 1841, W. K. Loftus, 1852, and therefore did not take impressions of the inscriptions, thinking they must be well known. A gallop of four miles across the plain brought me to the tepe past the remains of an old earthwork. The tepe is formed by the accumulation of ruins of ancient buildings.

16*th.*—*Mal-i-mir to Kaleh-i-Tul*, 15½ *miles. Good road. S. by E.*—We are now at Mal-i-mir and fairly out of the mountains, though there is still some hilly country to encounter, yet it is all of one description, viz. gypsum and marl, or "*gatch match*" as the Persians say. Till now, in crossing the numerous mountain ridges from Ardall, we have come on a rather varied geological formation. Up to that place the mountains were of the usual shapes and of the limestone so common in Persia. Mortar was burnt just wherever it was wanted. In some places the limestones were very close-grained, and took a polish like marble. At Dopulan were cliffs of conglomerate and of fine-grained limestone, like that of Persepolis. After

Hilisat more conglomerate. The rocks almost all have outcrops to the south, though this is notably not the case at Dopulan and on the left bank of the Rudbar. We saw but one lake, viz. that to the east of the two shown on the map. The other may be visible after heavy rains, but did not exist in December 1881.

At Mal-i-mir we began to see birds, such as black and white kingfishers, francolin, spur-winged plovers,—common Western Asian and Levantine birds, straggling as far as India; the haft bhai, *Chattarhœa Huttoni*, &c., &c. Among the Bakhtiari hills, though birds were not plentiful, we found choughs, ravens, crows, magpies, jays, with more white in their wings than the English variety; long-tailed tits, and lesser tits, and cole tits, pied wagtails, and the yellow variety; the green and the St. Johannis woodpeckers, nuthatches, the grey smoky-coloured thrush, larks, chaffinches, and common buntings. Ibex, markhor, and bears are found on the mountains, as well as the wild sheep. On the morning of the 16th we went to the south side of the plain to a break in the mountain somewhat similar to the one I visited yesterday on the north, except that the bay ended in a cavern. Above the cavern are some tablets of sculptures in bas-relief; the one to the right, or north, has three figures in the attitude of making a petition. They have a turban of peculiar shape. The next panel contains people in the attitude of attentive servants, and they have hats somewhat in shape resembling our English helmets. The people here have remarked this, and thought we should be able to read the cuneiform inscriptions at sight, which they call Khat-i-feringhi, or European writing. They were much disappointed to find we knew nothing about the writing, and to hear that the people who wrote them were the Persians', not our, forefathers. The king or potentate, the central figure of the group, has doubtless been washed away, as his position is now occupied by a watercourse, spilling over the face of the rock in time of rain. In the entrance to a sort of cave—not the main cave—are two figures, both much worn and defaced, and over and around one of them are cuneiform inscriptions in letters, of elements the same size as those of yesterday, but they are much defaced by age.

Leaving the ancient cavern, we quitted Mal-i-mir plain at its south-east corner by a valley with many tall reeds scattered about, then sharp to the south of a valley between rocky hills, but for which rocky hills and the absence of a stream down it, it would be like an English park.

Tall grass, now somewhat dry, surrounds the stately oaks which are dotted here and there. Cattle grazing under some of them add to the effect, though the marks of porcupine recall the East to our mind. The road emerges from this valley on to a barren, stony plain, in the centre of which is seen a barrow or tepe, crowned by the fort of Kaleh-i-Tul. This is the stronghold of a certain Mirza Aga Khan, who looks on the Ilkhani as his suzerain, though he is more or less independent of that chief. This Khan's subjects on the left bank of the Karùn are called Chahalang, and were formerly at deadly feud with the Haft-lang, or those who dwell on the right bank; but the Ilkhani has altered all this.

Mirza Aga Khan is repairing his fort, which is built in two tiers, that to the north being the lower.

17*th.—Kaleh-i-Tul to Sarasia or Rud-zerd*, 13 *miles. Level road, except one difficult bit over gatch hills, which could be made good.* S.—We leave the fort of Kaleh-i-Tul and go south-west over the barren plain; crossing a low spur we descend into another portion of the plain, still with no signs of cultivation. On the far side we come to a poor, small village, where there is rice cultivation on the banks of a stream, and the wild myrtle clumps look fresh and handsome. We leave the ruins of Bagh-i-malek or Man-zanik on our left, and following the course of the Ab-i-zerd and crossing it we go through a pass in some low gatch

(gypsum) hills, and then south for three farsakhs over a vile road to Sarasia, or Rud-zerd. Just before reaching this Iliyát village we recrossed the Ab-i-zerd, which is here 20 feet wide and 3 feet deep, and turns several mills. There are some patches of rice cultivation on its banks.

18*th.*—*Rud-zerd to Goorgeer*, 20 *miles*. *N.E.*—From Rud-zerd to Goorgeer, about six farsakhs, there is a slight rise through the low hills of roughish gatch through which we are now marching, somewhat north by east. To the south the country is a hummocky mass of gypsum hills. We cross the upper courses of several streams draining down from the watershed of the Kuh-i-asmari, which from Goorgeer extends to Rud-zerd, though it is only near the former place that the hill gains the elevation which makes it a landmark all over the southern country.

The streams are sluggish, with deep pools cut out of the gypsum beds; fish 14 inches long. The road was not bad to the highest point, but beyond this to Goorgeer it is stony and terribly rough (alt. 1480 feet).

19*th.*—*Goorgeer to the open valley at a place named Shikarab*, 14 *miles*. *S.E.*—Goorgeer is a wretched place in an open patch amongst the gatch hills and at the foot of the bare Kuh-i-asmari; the people are Seyuds, and consequently, of course, inhospitable. The crops here and there look quite insufficient to support the population who refused both to sell and to give us anything. We crossed a sulphurous stream which, apparently coming from the direction of Mal-i-mir, passes at the north-east of Goorgeer. Despite the noxious taste of the water, rice-fields flourish on its banks which we follow to Tembi, where, not being Seyuds, the people are civil and at length supply us with a guide. A small stream of fresh water falls into the sulphurous river, and by its bank we had breakfast.

There is some cultivated ground about Tembi, after leaving which we see no cultivation till we reach Shuster. Our road recrossed the sulphur river and turned due south for two miles. Then quitting the neighbourhood of the river east by south we are in gypsum hills for the remainder of the day's march, only descending at nightfall by a very bad zigzag into a broad open valley, through which a tributary of the Karùn flows. This also is brackish, but some just drinkable water is reached at a spot named Shikarab (sweet water), I suppose with the idea of comparison, for, as I have said, the water is only just drinkable and tastes of naphtha. We slept in the open under a konar tree, the night being warm and balmy. There were of course no supplies, but firewood plentiful owing to the numerous konar trees dotted about in a most picturesque manner.

20*th.*—*Shikarab to Shuster*, 30 *miles*, *good road*, *level*. *N.W.*—We started before daylight as we had a thirty-mile stage into Shuster. All the morning we were marching down the open vale, bounded on the north by the plateau of gypsum we crossed yesterday, and on the south by a ridge of sandstone which running east and west divides this valley from the plain of Ram-Hormuz. Every now and then the road crosses the brackish stream, and the junction of the Goorgeer stream is seen to the north-east. There are ruins showing that this valley was formerly peopled. We halted for breakfast as our road entered the sandstone hills on the south; the springs' water still brackish and barely drinkable. We were directed along the ridge which dies out as it approaches Shuster, only to crop out in a bold bluff of sandstone; it presents the most remarkable instances of false bedding I have ever seen. Amongst these hills were well-built masonry retaining-walls, evidently intended either for the storage of water or to terrace the hill-side. The earth at present is level with the tops of the retaining-walls, which show skill and labour far in advance of those of the present inhabitants, who now entirely neglect their country. Darkness had set in before we reached the town, and we had to flounder about amongst the way-worn slabs of rock, making for the lights that

twinkled in the distance. At last we found ourselves on the banks of a rapid stream with the roar of a cascade sounding in our ears. We discover a native in a hut who conducts us by a built road across the flood and through the narrow streets of Shuster to the castle, where rooms are placed at our disposal.

NOTE.—*Comparison of Routes from Ispahan to the Sea.*—The ordinary route from Ispahan to the sea, now followed by caravans, is viâ Shiraz to Bushire. Along this route caravanserais are built at convenient distances and supplies are forthcoming.

From Ispahan to Shiraz, distance 323 miles, there is little or no engineering difficulty, and with a comparatively small expenditure of capital a good carriage road could be made. Beyond Shiraz the road is in places execrable, and scarcely passable for laden mules; but it is capable of vast improvement, and a carriage road could follow its general direction.

The distance from Shiraz to Bushire is 196 miles. Along the Bakhtiari route, viâ Ardall and Mal-i-mir, there are no caravanserais of any sort, no bridges over several of the rivers, and in winter, when the nomad population moves bodily to the Shuster plains, there would be no supplies.

However, supposing the Karùn river were opened for navigation to Shuster, and the necessary canal dug out at Ahwaz, goods could be unshipped within 275 miles of Ispahan; that is, 244 miles nearer than viâ Bushire, for it is 519 miles from Bushire to Ispahan. Still the difficulties to be met with in these 275 miles are very great. It has been suggested that a light railway might run over them; but this is in my opinion out of the question, as the cost of the undertaking would be so enormous, the valley of the Karùn and its tributaries having such precipitous sides that it would often be necessary to carry the road in galleries cut in the hill-sides for miles. The bridging, too, would be tremendous; and if the line were carried out at right angles to the series of ridges that lie between the plateau of Chahar-mahal and Mal-i-mir, the line would be little better than an alternation of tunnels and viaducts. I think the railway engineer would prefer to take his line from Shuster viâ Behbehan to the Ardakhan valley. He would find no stupendous obstacles this way, and would have wormed himself to the roof of Central Persia without crossing one of the ridges that guard it: he would tap, too, its most fertile plains and include Shiraz. The 7200 feet kotul that lies between Ardakhan and Shiraz has no difficulties or gradients that a "Fairlie's" engine, such as is used between Poti and Tiflis, would not surmount. Or I should recommend the trial of the valley of the Shahpur river from Bushire to Nodun, where a tunnel would lead through to the river Shur or Fahlyun, which runs from Ardakhan.

But to return to the roads. The difficulties of the Bakhtiari route are considered so great at Dizful that all caravans for Ispahan go viâ Burojird, and it might be best to take them from Shuster viâ Dizful and Burojird to Ispahan, though the distance this way must be at least 350 miles, from Shuster probably 380. Unfortunately I have not seen this route, so cannot speak of its merits; however, water is said to be plentiful, and the road not bad. Certainly this is the case from Burojird to Ispahan. The difficulties of the Shiraz-Bushire road are all within a distance of 93 miles, viz. from Daliki to the Karagatch river; those of the Bakhtiari route are within the distance of 117 miles from the plain of Mal-i-mir to the borders of Chahar-mahal.

The Shiraz road is certainly villainous from Daliki to the Konar Takta plain, a distance of 11 miles. Again, the Kamàrij Kotul is abominable, 6 miles. To avoid the Karagatch heavy work would be required for 4 miles. To avoid the Kotul Dukhter and carve a road out of the hillside to the south of it, 5 miles. To turn the Kotul Pir-i-zan and make a carriage road to Dasht-i-Arjan, 12 miles.

To turn the Sena Safid Kotul, 6 miles. Total, 44 miles. These 44 miles allow for gradients and comprise all the heavy works. I think the five miles for the Kotul Dukhter might be saved by entering the Dasht-i-Ber from the Shahpur valley, but of this I am not positive.

The Bakhtiari route is in my opinion out of the question for wheeled traffic; but suppose it were tried, caravanserais built, and the Karùn bridged, we should have heavy work from the Mal-i-mir plain to the Karùn river, for 15 miles; from the river to Deh-i-diz, for 10½ miles; and from Deh-i-diz to Rudbar river, for 12 miles; from Rudbar to Hilisat, 15 miles; Hilisat to Dopulan, 19 miles; Dopulan to Ardall, 7 miles; Ardall to Chahar-mahal plateau, 20 miles at least. Total, 98½ miles. It would be necessary to add at least 25 per cent. to these, the bare distances from point to point, in order to allow for decent gradients, so that we have $98{,}5 + \frac{98{\cdot}5}{4}$, or 103·1 miles of difficult hill-road making, and this would add 24·6 miles to the distance from Ispahan to Shuster.

From the Mal-i-mir plain to the Karùn the gradient is not excessive, but from the river to Deh-i-diz the present track is too steep for wheels. From Deh-i-diz, which has an altitude of 5221 feet, the road rises to 6400 feet in four miles. Descending to the Rudbar stream, in six miles to 3080 feet. Ascending above Hilisat to 6900 feet, and descending to Hilisat, 4850 feet in four miles. From Hilisat it has to rise over 7850 feet, to descend to Dopulan, 4950 feet. Here at Dopulan a 1000 feet gorge has to be managed, and the road carried thence over the ravine cut plateau of Ardall, through mountains Chokahor, and thence down into Chahar-mahal (6700 feet). Mackenzie crossed from Ardall viâ Chokahor, and made the altitude of pass 8350 feet. To follow the Karùn would be twice as long and just as difficult. These altitudes are relatively though not absolutely correct.

3. *Shuster to Shush and back, and thence to Ahwaz.*

Shuster to Ab-bid, 18¼ *miles level. W.* (*a little N.*).—We were detained for three days at Shuster (population 6000), and were delighted when we escaped across Valerian's bridge. Along the road to Dizful we kept the northernmost of the two roads, as we should be less liable to be detained by floods; and crossing the sandstone and conglomerate ridge which hems in Shuster on the north-east and north, we traversed an open, rich, alluvial plain to Ab-bid. The road crossed two or three nullahs, which would be awkward in flood, but would soon run down. The plain has many villages, and is pretty universally cultivated. Corn is so plentiful that our bread was not charged for, nor the corn for our horses, and yet this plain is tilled in the most slovenly manner by a most lazy people. Ab-bid has only say three families, but supplies are plentiful, and there is a good spring of sweet water.

We looked out for the shrub *kalebleb*, which attracted Loftus' attention so much, and found it to be an old friend. Large quantities grow at Daliki, near Bushire, to a height even of 12 feet. Loftus is wrong in describing its flower as white and large, for it is the size of a scarlet geranium, and grows in clusters like that flower; it has five petals, and is of a deep purple colour with a white eye. There is no doubt we were looking at the same plant, as the white sap was there, and the natives volunteered the name *kalebleb* for it. The seed is very peculiar, a huge pod hanging like a pitcher-plant flower.

November 25th.—Ab-bid to Dizful, 18¾ *miles level. W.*—From Ab-bid to Dizful six very easy farsakhs of level ground, crossing a 500 yards' wide water-course, which had already run down and become dry. There are low hills to the

south and bluffs of sandstone to the north, but they both die out before Dizful is reached. Along the sides of the watercourse we found francolin and snipe. As we approach the latter place, large tracts of ploughed land haunted by innumerable cranes. The town from a distance looks like Bushire, as it is standing on a plain somewhat higher than the right bank of the Dizful, and so appears to be over the sea as it were.

The town (population about 20,000) seems cleaner than Shuster, and we are kindly welcomed into the smart telegraph office by Mirza Ali Mohammed, the name mentioned by Lady Anne Blunt. There is no opium grown here, but a large amount of indigo, as much as 1000 camel-loads being sent inland every year.

We employ the evening going down the river and across the bridge, which is 40 feet above the stream, 455 paces long, and has its twenty-one arches pretty well in line. The view looking from the bridge is picturesque and curious, the river is rapid, and still somewhat flooded from the rain of the previous few days. It has played havoc with the mills that are built in rows out into its course; the mill-wheels, as well as the causeways leading to them, showing marks of having incurred considerable damage. On the left bank, or right-hand side looking up stream, the conglomerate cliffs rise sheer from the water to a height of 40 feet, and above them the quaint mud-houses in irregular shapes. In the distance the hot, bare hills of the lower slopes are backed up by the mountains with crests of new-fallen snow.

26*th.*—15 *miles. S.*—Crossing the Dizful bridge, we turned sharp south, and kept almost parallel with, and not far from, the river. The ground is covered with shrub of tamarisk and aspen, and a kind of half-willow and half-poplar, the *gharab* or *Salix Babylonica*, as proved by Schindler. It is dry under foot, and the trodden herbs emit a pleasant odour. Quitting the Dizful where it turns to the east, we cross some rising ground, and in the distance see the stupendous mounds of Shush or Susa. In the foreground is an encampment of the Ali Kasir Arabs, of about seventy families. To the right of the mounds is a real forest, such as gives colour to the often-told story that there are lions in this part of Persia. It is skirting the banks of the Kerkha river. Beyond is a beautiful plain covered even now with verdure, and leading one's eye up to the setting sun. "What a magnificent site for a city!" is what one exclaims at once; but, if possible, the view from the mounds of Shush looking north is finer than the one we are now describing, as you have all the rolling plain, with the red hills and the snowy mountains changing colour and throwing shadows as varying in hue as the dying dolphin. It is with a feeling of intense excitement that one nears the site of the ancient city renowned in biblical history, and doubtless for some time queen of the eastern world. The tomb of the Prophet, though not the place of his burial, doubtless marks a spot on which his eyes must often have rested and his feet have trodden.

The Shour (Shouour) or Shawer, though only 10 yards in width, is not fordable till 16 miles below this at a place named Ammat-ul-Zimman; at night this place resounded with the cries of jackals, attracted no doubt by the large number of francolin that there are. Three years ago the cloisters or verandahs round the shrine were rebuilt by the Itisham-a-Sultaneh, whilst the caravanserai was rebuilt by the Hishmet-ul-Dowleh. Curious to say, no trace of the fragments of the "black stone" * is said to have been found in the pillars of the verandah; the present guardian of the tomb is the son of the man who was there in Loftus' time, and remembers the latter being at Shush.

27*th.*—Passed a bad night; before dawn, the spur-winged plovers made a terrible

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* For history of black stone, see Loftus' 'Chaldea and Susiana.'

din, with their rude, often-repeated question of "Did you do it?" and, as it were, working themselves up into a terrible rage. As day dawns we climb the citadel, with difficulty, its sides are so steep; it would hold, I think, a garrison of 3000 men, and commands the surrounding mounds completely. I could see no sign of the depression in which Loftus would have one to believe the Eulæus flowed, unless this latter were merely a ditch that, flowing from the Ulai, surrounded the palace and citadel. After inspecting Loftus' cuts and excavations here we went to the site of the palace and there saw the bases of the columns and remains of winged bull, starting a large hyena close by it. In the afternoon we have to start for Dizful, and we shoot as we go, getting seven brace of francolin, a woodcock, and quail. We also saw a lot of pigeons, geese, and wild pigs. We arrived at the comfortable telegraph office considerably after dark.

28*th.*—*Dizful to Qouneg, or Gawnek, or Koonak*, 19 *miles level. E.*—Despite the rain we start at 8.30. A guide turns up after us. We have decided to go by the southern road, and the much-enduring telegraph wire is our guide. Our friend, Mirza Ali Mohammed, has had no communication with Tehran for 14 months, the wire being down to Burojirt; the wild hill tribes destroy it as fast as it is put up, but from here to Shuster it hangs in a marvellous manner. The weather cleared up at about 10 A.M., and we breakfasted at the site of an ancient city. Our stage to-day was Koonak or Gawnek; we are still crossing plains of such fertility that with the little rain that has already fallen they have become carpeted with green.

29*th.*—A Bakhtiari Khan, named Dorab, accompanies us out along the grassy plain, where ancient water channels, coming from the Karùn far away, tell of a bygone civilisation. Now the fruitful prairie is given up to rooks and starlings; vast numbers of the latter are hawking here like bee-eaters. At night in flocks of hundreds of thousands they fly over Shuster to roost in the palm trees at the south part of the town, and at morn or daybreak the sound of their whirlwind is the one thing lively in the place. This southern road viâ Qouneg passes through the sandstone hills, and no rough country is encountered. As you enter Shuster from this direction you see what a nook it lies in, and its damp and heat are accounted for.

30*th.*—*Shuster to Band-i-kir*, 25 *miles. Perfectly level. S.*—We left for Ahwaz, viâ Band-i-kir (80 inhabitants, Arabs), over eight farsakhs of level ground, the road going due south. Near Shuster the few cultivated fields show what could be done if this country had a decent people to inhabit it.

The alluvial plain we are crossing would be impassable after rain, the soil is so deep and clayey. We pass two Arab encampments. Here and there are patches of jungle, large flocks of rooks and starlings. Where do these rooks build? There were dove-coloured stilted plovers, too, in addition to the ordinary kind. At Band-i-kir we have some trouble to get a roof over us. Band-i-kir is on the point of land dividing the Kaisir Band or Gerger stream, which is diverted from the Karùn above the castle at Shuster, and the Shtait or Karùn proper. The Dizful river also falls in just opposite, we have therefore now to cross the first of these three so as to get on to the left bank of the combined river, on which bank Ahwaz stands. This ferrying may be avoided by leaving Shuster by the Pul-i-belaitee, or east gate, and keeping along the left bank of the Kaisir Band or Gerger stream. But this would make it three days' journey to Ahwaz instead of two.

December 1*st.*—*Band-i-kir to Ahwaz*, 27 *miles level.*—The Gerger here is 50 yards wide and exceedingly deep. We failed to get bottom with the oars of the boat which was there ready to ferry our men and baggage across. The horses and mules swam easily in the placid stream, and the whole business did not delay us more than 1½ hour. Our road lay through Weis, an Arab village

on the left bank, then 10 miles on we reach Ahwaz, a miserable place of some 300 inhabitants of a low type of Arabs.

I here give Mr. Mackenzie's description of the road on to Mohammerah—"Ahwaz to Ameerah, three farsakhs; Ameerah to Samayme, five do.; one stage. Samayme to village above Mohammerah, seven farsakhs; village to Mohammerah, two do.; one stage. Leaving Ahwaz we are on the left bank, so it is necessary to get to the right, or Mohammerah bank. The animals can be swum at Ameerah, but there is no village or supplies beyond on this bank, and camp has to be pitched in the open; however, four farsakhs of road is said to be saved by this way."

The other route is viâ Samayme, which would seem to be on the left bank and eight farsakhs from Ahwaz, and then from Samayme to village above Mohammerah, seven farsakhs. Here animals can be swum, and it is only two farsakhs on to Mohammerah. It is obvious therefore that one ferrying must be undertaken somewhere about Mohammerah and another at Band-i-kir, or a day's extra march is required to skirt the Gerger stream.

Mr. Mackenzie describes the country from Ahwaz to Mohammerah as similar to that from Shuster to Ahwaz, open and dead level, but difficult after rain owing to sticky nature of soil.

4. *Ahwaz to Shiraz.*

3rd.—Ahwaz to east side of Shakhe marsh, 27 miles. Level plain with no road. E. by S.—Left Ahwaz* at 6.30 A.M. The weather was bitterly cold, and a dank fog lay over the country. There is a marked coolness in the climate at Ahwaz as compared with that of surrounding country. This is remarked by the natives, who, like ourselves, are at a loss to account for it. We travelled across the trackless plain of Ram-Hormuz in a direction a little south of east, and followed for many miles the base of the sandstone hills that trend away in that direction, as described in my Ahwaz report. The country here is very fertile. No artificial irrigation is required. The Arabs till soil enough for their own wants, and no more. Sugar was grown here at one time, though, I believe, with doubtful success.

We were told to keep together, as the Arabs of these parts are notorious robbers, and a well there is in the hills is a noted trap of theirs. We saw large flocks of gazelles and an occasional houbara. As the sun rose, we threw off first our ulsters, then our thick jackets, and would fain have stripped to our shirt-sleeves, such is the terribly trying changeableness of temperature in this part of Persia, which vies with that of Afghanistan and Peshawur, and combined with the muddy or brackish water which forms the drink in these parts, tends to affect the strongest stomach. Just as the sandstone hills are "hull down" on the south-west horizon, we come in sight of a large marsh with fine cattle and buffaloes amongst its reeds. Some care has to be taken to find a fordable track across it, and an abominable smell rises from the ooze as it is trampled by our animals. There are plenty of snipe and ducks. The water is brackish, and tastes a little of naphtha. The name of the place is Shakhe, or rather this is the name of the district on the sandhills to the east; the long black line of tents shows the situation of the encampment of the "Bowie" Arab tribe, which is our destination. As we emerge from the marsh we see a great commotion in the camp, men moving in masses, firing guns and flashing sabres. Our guide and servants are alarmed, especially the former, who has a bad conscience, having once taken part in a raid against this identical clan; he has to keep a strict incognito, or risk the loss of his ears. Old campaigners, however, at a glance would see that there was no fear, for are not the women here at the margin of the marsh under our

* Ahwaz is only 200 feet above the sea. Population about 300.

horses' noses, carrying the brackish fluid in their goat-skins? The fun, for such it proves to be, goes on fast and furious, and no notice is taken of us as we make our way to the sheikh's tent and commence pitching camp in its neighbourhood. It appears that the sheikh has just returned from a journey, and all this fuss was to welcome him home. His brother comes and introduces himself; gradually a knot of the old men gather round us, and then, as interest increases, the whole company of braves dances past for our special edification, the chief's brother caracoling his mare backwards and forwards in front of the line, waving his body in graceful attitudes. The braves were all dressed in long white clothes, and danced a springy sort of step as they advanced in serried mass, waving their swords and pieces, and chanting a wild refrain to the honour of the sheikh. After nearly stampeding all our horses, the youths subsided into their ordinary ways.

4th.—Shakhe marsh to camp of Sheikh Jabereh Khan, 23¾ miles, easy road. Ram-Hormuz, 8 miles further. General direction, E.—The Bowie camp at Shakhe comprised 700 families; they were hospitable enough, and comfortably housed in their tents, walled with reeds from the marsh. The drawback was the brackish water, the salt taste seemed to pervade the milk of the flocks and herds that drank it. Apparently, however, the pasturage on and near the marsh is too good to be abandoned, so salt drinking-water must be submitted to. The large flocks of beautiful sheep testified to the goodness of the fodder. We have done with the level plain. To the north and east the ground is undulating. Our way (there is no track) soon meets the Gopal river as it meanders slowly between mud banks 18 feet in height. It has a taste of naphtha, and is the same brackish water that is found in the marsh, which in fact is fed by it. On the banks of the stream are the "Bowie" tribe's summer grounds. There are signs of cultivation, and jars of unburnt clay made for the purpose of holding grain. The Gopal showed marks of floods 6 feet higher than its present or normal level. It was 30 feet broad and 3 feet deep when we crossed it. The road, for a track has commenced, leads through marly and gatchy hills to a raised plain, and the head-waters of one of the branches of the Gopal is crossed. Our way was along the plain to the village of Mir Batcha, which is situated on a "tepe," thence the plain slopes gently down to Ram-Hormuz. We halted half-way down at the tents of Sheikh Jabereh Khan, who received us in durbar, surrounded by the men of his tribe. They are a fine-looking set, well behaved; they have good horses too; and their coffee is the best I have ever tasted. Samples of the naphtha from the well on the road to Shuster, shown on St. John's map, were examined, and proved to be excellent. There is not much of it, they say, and the spring has been known to fail entirely, after catching fire. The water here is slightly brackish. Around Ram-Hormuz is much cultivation, and plentiful rains bring crops to perfection.

5th.—Camp of Sheikh Jabereh to Rustamabad, across level country, 14 miles. E. by S.—A tremendous tropical thunderstorm came on and we were drenched to the skin; had great difficulty in crossing swollen streams of the Alai, into which our old friend the Zerdab flows. There was no road, as we were avoiding Ram-Hormuz. Two mules washed off their feet; we waded along through flooded paddy-fields, past a village named Pilip to another named Rustamabad. Luckily, the sun came out at 3 P.M., and we were able to get a few clothes dried. The people here are a wonderful change from the aquiline-nosed Arabs we had recently left. They are a colony of Kohgelo Lurs, who have migrated hither from Behbehan. The Khetkhoda of Rustamabad is a jolly old fellow, in face resembling the bust of Socrates. He is a warrior, too, and killed the father of Dorab Khan of Gownek, with whom he had a feud. The people are flat-nosed and big-headed, their broad foreheads being rendered preternaturally high by shaving. This night there was a

total eclipse of the moon, and all the villagers turned out to fire at the demon that was supposed to be devouring the Queen of Heaven.

6th.—Rustamabad to camp near Jaizun, 18¾ *miles. E. by S.*—The Socratic Khetkhoda evidently thinks we are made of money, and disdains accepting the gold piece offered in payment for the small amount of grain and bread, and a diseased sheep he supplied us with. The sheep made us all ill, though now that we have got into a sweet-water country we can eat most things. We have hit off the track, and just outside Rustamabad we cross a stream named the Shoura,* insignificant except in flood time. Our road going slightly south by east, enters the broad, open valley of the Kardistan river, bounded on the south by a low range of hills not shown on St. John's map, and on the north by a lofty range; we are marching up-stream, and two miles parallel to and north of it, so have to cross the deep-cut courses of many mountain torrents. Luckily we did not try these yesterday, or we should have been brought up on the bank of the first one. Their sides could be ramped for the passage of wheeled vehicles. Six and a quarter miles (two farsakhs) from Rustamabad (about 150 inhabitants) is Sultanabad, a small village, with a few date-palms and some bean cultivation. The valley is here about 4½ miles broad, and the river only 1½ mile to south; a few miles further on, the road comes right to its bank. There are large quantities of konar-trees in the plain and aspens along the river-side. This would be a fertile spot if it had a settled population. After passing the fourth torrent at right angles to our road, we come on some cultivated ground, and see the Arab encampment we are to halt at. We got some black francolins to-day. The night bitterly cold, with sharp frost; Arab children crying with cold, we badly off with half-wet bedding.

7th.—Camp near Jaizun to Deh-koreyseh, 25 *miles. Road rough across spur, but capable of being much improved; the rest level. E.*—Slowly our frozen people pack up. We warm ourselves walking after francolin or black partridge, which were plentiful in a grove of palms, with an undergrowth of wild vines and figs. We are handy to our caravan, as it passes the village of Jaizun, inhabited by Lurs. Our Arab guides disappear into the village. When we get 200 yards beyond it, we see several men running for the caravan. They commence to struggle with our people to carry off a mule, and demand black-mail. We dismount and lay on with sticks, drive them off well thrashed, send on the caravan, and then cover the retreat with drawn revolvers. Knives were being drawn and guns shouted for by the villagers, but by the time the guns arrived we were out of range; the distance was tried by firing at us. Fortunately the ground was open, and they did not think fit to run forward and hold the rough country we were now approaching. The Blunts experienced annoyance here at Jaizun. This nest of robbers ought to be done away with. It is beyond the limits of Behbehan territory, and Sheikh Jabereh seems to have no power. His men, our guides, were doubtless in collusion with the villagers. These worthies lost the present they were to have received from us, notwithstanding that they protested ignorance, and declared they heard nothing of the row. About four miles east of Jaizun the valley has narrowed considerably, and the road, no longer able to follow the river, strikes across the spur from the mountains, which spur here closes the valley. The road, though rough, could easily be knocked into shape, having no steep gradients, and the rocks mostly being conglomerate. From the north-east side of the spur a fine view of the Behbehan plain is gained. The town is in the middle-distance, with a fine range of mountains to the north with their snowy caps bounding the view in that direction. A low range of hills to the south divides the plain of Behbehan from that which runs down

* This must be the Alar of St. John's map.

to the Persian Gulf, and turns the river Jarahi west into the valley up which we have been travelling. On the left the road from Potek is seen, with the plain on that side a deep green from konar clumps. St. John's map shows the Potek road as joining the one by which we are travelling at Kai-kaus; but this is incorrect. We could hear nothing of Kai-kaus. The Ram-Hormuz road certainly does not go through such a place.

8th.—Deh-koreyseh to Behbehan, the Jarahi river difficult to cross, otherwise country level, 11 *miles. Direction, E.*—Last night our tent was pitched near the village of Koreyseh, of about fifteen inhabitants. A white frost and cold fog cover the land this morning. A stream from the direction of north has first to be crossed, and three miles from camp the river Jarahi itself forms a formidable obstacle. From bank to bank it is 70 yards wide, and in flood would be at least six feet deep; it is a rapid stream, and even now when only 45 yards wide is only fordable by strong men, being up to the horses' girths; in spring it would be a nasty flood to pass. Fine cover of tamarisk and oleanders marks its course, whilst beyond palm-groves, villages, and cultivated ground present an unwonted scene of prosperity and security for this part of Persia. Wild cabbage is the ordinary weed of the plain.

The governor of Behbehan, the "Nusir-ul-mulk," welcomed us most kindly through his young commandant of horse, a Shirazi gentleman, who spoke a little English. We were comfortably housed in a garden worthy of Shiraz itself. However, palms, which are here plentiful, are great rarities in the capital of Fars. The Nusir-ul-mulk is fond of gardening and building; the narcissuses are in full bloom; castor-oil plants, orange trees, and a few sickly plantains, with jessamine in bloom, are amongst the rarities.

The town has practically no walls; the population is between four and five thousand; it seems thinly peopled and tumble-down, yet delightfully clean compared with Dizful and Shuster. The water supply is poor; water has to be stored in ab-umbars or subterranean chambers for summer use. There is a regiment of infantry and a few guns here.

9th.—We halted and called on the governor.

10th.—The Nusir-ul-mulk came in person to bid us good-bye; he gave us a large escort and sent some treasure to Shiraz in our company.

From Behbehan to Kumesheh there is a road, the stages of which were thus given us:—Kumesheh, Takeen, Naknch, Felat, Khoy or Khur, Sisakht, Chenar, Saadat, Seri-ab, Deh-Dasht, Behbehan.*

The road is said to be tolerably good for mules, except for two stages near Sisakht which are bad, the people met with are Kohke-Lurs, with the exception of the first two or three stages from Kumesheh. The country traversed is inhabited throughout, and passable in ten days in winter, but in summer you can go in one day from Sisakht to Tesonge, which is the summer residence of the governor of Behbehan, and by this means a day will be saved.

11th.—Behbehan to Khairabad river, 15 *miles. Easy road with slight ascent. E. with a little south.*—Our road goes east across the plain of Behbehan and into the low hills that divide the basin of the Khairabad river from that of the Jarahi. We camp near the river, which is 30 yards wide and easily fordable, though in spring it would be a formidable obstacle, being rapid with a stony bed. Good francolin shooting here, and lions are occasionally found.

12th.—Khairabad river to Do-gumbazán,† 27½ *miles. S. by E.*—From Khair-

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* This route was followed by Mr. Stoqueler in 1832, and is described in his published travels.

† The two domes.

abad river to Do-gumbazán, direction south by east, the road commences well gradually ascends to the plain of Lishter, four miles wide by 10 miles long; a grand place for pasturing mares, even at this season there is grass, and the evergreen konars give shade, whilst the Shams-ul-arab stream, which bounds it on the south-east, supplies good water. The above-named stream is small except in time of flood. After crossing it we enter rounded gypsum hills and are amongst them for four miles of road, after which, crossing the water-parting between Shams-ul-arab and the Do-gumbazán stream (alt. 2480 feet), the road becomes level with hills on either side; that of Shah-ruh to the right front is remarkable in shape. The mountain on the left, marked on the map as Kuh-i-huma, but known as Kuh-i-dil, must be at least 10,000 feet in height, and looks well from the plain on which Do-gumbazán stands. They say the stream from this plain is lost in a marsh. The water from the snows of Kuh-i-dil mostly goes down the Shams-ul-arab. At Do-gumbazán is a ruined caravanserai and a small village, the first we have seen since Behbehan.

13th.—Do-gumbazán to Basht, 25 *miles. Direction, E. by N. Basht to Tel-espíd*, 18 *miles. E. by S.*—From Do-gumbazán to Basht (alt. 2730 feet), three farsakhs, there is a gentle descent over a plain showing marks of once being well peopled, though now a few tents are seen and a little cultivation. Great slabs of almost perpendicular limestone rise from it, and form the south of the Kuh-i-dil. The road runs to the north-east, and turns the east end of the mountain without much difficulty by threading between the knife edges of the remarkable limestone formation, and ascending a slight kotul called the Tang-i-narik (alt. 3230 feet). To the east of the mountain the country is quite park-like with the oaks which have again appeared. On nearing Basht the road was so bad, following a zigzag, for 1½ mile, that we had often to dismount; but we had evidently missed the way, for a better track was necessary for the rickety gun-carriage we have been tracing from Behbehan. The gun, it seems, reached the small stone fort of Basht only to be sent back again to Behbehan. The fort would hold 70 men. There is a permanent garrison of government people, but very weak. At Basht is a fine open valley running west by north to east by south, with a small stream capable of becoming an awkward flood. This in its normal condition trickles over a stony bed down the centre of the valley. The people (there are only about 100) are at feud with all their neighbours, and never dare wander out of sight of home. Large clumps of wild myrtle dot the plain; carraway seeds are cultivated, and an oil extracted for sale. A road goes from here to Mian Kotul, and is reported to be good. The snowy peaks above Dasht-i-arjan were visible from Do-gumbazán.

From Basht the road leads down and across the valley, past mounds evidently sites of ancient fortified places, and enters the low hills on the north-west; it ascends only to descend again, so as to hit off a watercourse, which must be occupied by a considerable torrent at times. Thence we go through a park-like valley with fine oaks; at the head of this is the first serious obstacle to wheeled vehicles that we have met with since Behbehan, viz. the Guzinjun ridge, which is of limestone rocks. The ascent, coming from the west, is nothing, but the descent of half a mile into the Chal-i-moreh plain is steep, rough, and difficult. The view from the Guzinjun ridge (alt. 2780 feet) is fine. The Chal-i-moreh valley, almost perfectly flat, has its alluvial soil standing level up against the stony hills. A narrow gorge admits the river, which meanders from the north-east, escaping by an equally narrow gorge to the west. The plain extends to the east, like an arm of the sea, the sluggish stream of the Ser-ab-i-siah draining this arm and falling into the main stream two miles from the ridge. The fords of the main river and that of the Ser-ab-i-siah are easy; that of the latter is just above where a remarkable mound, evidently

artificial, is now crowned by a ruined mosque. The mound is circular in shape, has 40 feet of steep scarp, and 70 feet diameter. The Ser-ab-i-siah evidently was formerly led round the east side of the mound as well as the west, and a wet ditch was thus secured, but now there is only water on the west. This river is said to rise at one burst from a huge spring half-way up the valley which has been likened to an arm of the sea, certainly we saw nothing of the sources at the head of that valley, or rather at the narrow neck of level called the Pul-i-safid, where it emerges into the Tel-espíd plain. Moreover, there was an irrigation channel from Tel-espíd, formed evidently to water this upper portion of the "arm," above the sources of the Ser-ab-i-siah, so the tale of the spring is probably true (altitude of Tel-espíd, 2830 feet). Tel-espíd plain is similar to that of Chal-i-moreh in character, only more circular than oblong, which is the shape of the former. One's attention is attracted by the square mud towers of the Lur inhabitants, all placed on artificial mounds commanding the tents or huts at their feet. These Lur people stay here all the year round, but prefer not to build houses for fear of the tax-gatherer getting a firmer hold of them by means of their fixed residences.

From Tel-espíd to Kazerun there is a road down the valley of the Shahpur river. The stages as given us are these:—From Tel-espíd to Nuradabad, three farsakhs; from Nuradabad to Nodun, seven do.; from Nodun to Kazerun, six do.; or from Nodun to Mian Kotul, six do. This Tel-espíd plain is watered by the Fahlyun river, as I prefer to call it (after the principal village and tribe of the Tel-espíd plain). It is shown as Ab-i-shur in St. John's map, and as the Rudyan river and Tang-i-khast, or Shaspir, on my sketch. Rice-fields seem to absorb the whole of this rapid stream, for not a drop could we see in the watercourse which leads from the plain to the south-west, but numerous irrigation channels were to be traced, notably the one leading to the head of the Ser-ab-i-siah valley.

14th.—Tel-espíd to Pul-i-murt, 16 *miles*.—We followed the Tel-espíd plain to north-east, and went straight to a steep, rugged kotul (alt. 3830 feet). Obviously there must be a better line for a road where the river enters the plain. Having descended the other side of the kotul we are by the river-side again, and two miles further up stream we are at the foot of the precipitous hill named Kaleh-safid, from the white colour of its rocks and its being used as a stronghold in time of disturbance. There is only one way to the top, and that no easy one. The sides are scarps of perpendicular rock. This hill should be on the left bank; it is marked on the wrong side of the river in St. John's map. Just by Kaleh-safid the Fahlyun river is joined by the Sul stream from the north, the main stream from the east being here called the Tang-i-khast river. It is 18 yards wide and three feet deep, flowing very rapidly. It gets the name of the Tang-i-khast stream from a narrow gorge through which it flows. This gorge would be the natural direction of the road to Shiraz, but for some reason the Sul is followed in its north-easterly direction, and along it a very rough bit of country is encountered. The road crosses the Sul stream no less than four times in three miles, and is bridged at the fifth crossing by the Pul-i-murt ("Bridge of the Myrtles"). At this "Pul" we rested for the night, there being an old caravanserai.

The Pul-i-murt is named after the extraordinarily fine myrtle that flourishes in groves near at hand. Blackbirds and robins delight to hide in these thickets, and remind one of Devonshire by their notes at sun-down (altitude of Pul-i-murt, 3630 feet). Oleander and wild almond too flourish in this narrow valley, shut in and protected as it is from winter blasts. Our servants and muleteers are all falling sick, owing to the cold we are experiencing and the long-continued marching. The people on this side of Behbehan are totally different in appearance

from the Bakhtiari, the fine-drawn Arab, or the flat-faced Kohgelo-Lurs we have been accustomed to. Here the Mamasseni-Lurs are the finest-looking men I have yet seen in Persia. They have a handsome Jewish cast of countenance, with very aquiline noses and long beards; the moustaches drooping and lighter coloured; the hair also light-brown; the eyes often are black, but sometimes grey. They wear the tall, brown felt hat of the ancient Persians, much more imposing than the round-headed cap of the Bakhtiaris and Kohgelo-Lurs. One of the guides to-day amused us much. He was a good-natured fellow with weak eyes. He was always shouting at his horse or asking absurd questions about Feringistan, such as whether we raided on one another's villages? how he would be received if he went to London? &c., &c. This lad had no idea of distance, and did not even pretend to know the length of a farsakh. Another guide was a Bakhtiari who was always making disparaging remarks on the country we were passing through, and singing the praises of his own, which is not, in my opinion, to be compared to this. Guide is a misnomer for the people supplied by Persian authorities, as most of the men who come pretending to show the way have never travelled the road they are now acting as pilots for.

15*th.*—*Pul-i-murt to Tang-i-rudyan*, 24½ *miles.*—From Pul-i-murt we follow the main stream of the Sul river along its left bank, having crossed to that side. The valley is pretty and well-wooded, though narrow and steep-banked. The road could be made very good as the gradients are not very difficult. Rice cultivation is seen near the water wherever the valley widens, and now and then clumps of myrtle appear. A solitary mill is the only habitation we see during the day. The track, leaving the head-waters of the Sal or Sul, turns east through a narrow gorge capable of carrying a good road, and by easy gradients the watershed that divides us from the plateau of Tang-i-rudyan is reached. We saw many marks of bears and of a panther here, also of wild pig and sheep (alt. 6950 feet). Having crossed this, the descent to the banks of the Tang-i-khast or Fahlyun river, which here is called the Tang-i-rudyan river, is easy and gentle. We are now on an extensive plateau, bounded on the north by the Kuh-i-kum-firuz, on the south by the lofty range that runs west from Dasht-i-arjan, and on the east by the Kuh-i-barafi of Shiraz and the Kaneh-zenun hill, known as Kuh-i-kelat; on the west, the plateau dies out in the hills that bound the Sal river.

At night we reach the village of Tang-i-rudyan, situated at the bottom of a narrow valley carved out of the plateau by the Fahlyun river, which is here, as at Kaleh-i-safid, perfectly sweet (alt. 5400 feet). How it came to be called the Shur, or "salt river," was explained by a man here, who told us that between this and Kaleh-i-safid salt is manufactured on the banks of a tributary of the main stream, the waters of the tributary being highly impregnated with chloride of sodium.

17*th.*—*Tang-i-rudyan to Goyum*, 24 *miles. S.E.*—We leave the fort and valley of Tang-i-rudyan, the headquarters of the Dushman-Zeari Lurs. A steep climb of 600 feet and we are on the level of the plateau; 200 feet more and we cross a ridge that, running from the direction of Shiraz, divides the plateau in two, but dies out here at Tang-i-rudyan. From the summit of this ridge Adakhan is visible, and a plain dotted very sparsely with villages. With a settled government this would be a rich place indeed. Vines are grown along the hill-sides, as we follow the northern slope of the ridge to where the plain dies out at a village named Shul (alt. 6725 feet). The people are not the men that the Tel-espíd plain produced, though they belong to the same clan; the women, however, are remarkably pretty, and do not cover their faces. A gentle ascent from Shul takes you to the watershed dividing the basin of the Fahlyun river from that which drains into the Shiraz valley. This watershed is at altitude 7350 feet. We camp at Goyum

(alt. 5750 feet), a Seyud village, and experience extreme cold. The country is now the regular central Persian hill and barren valley.

Goyum to Shiraz, 21 *miles*. *S.E.*—Descending gently to Shiraz, now and then passing a walled village and regular gardens at Musjid-i-bardi, we reach our haven after 20 miles' ride, and get news of the world after six weeks and a day's absence from it.*

Lieutenant Wissmann's Journey across Africa.

Map, p. 184.

On January 19th Lieutenant Wissmann gave a lecture on his march across Africa before the Khedivial Geographical Society, at Cairo, in illustration of which Dr. Schweinfurth prepared a large diagram, based upon the explorer's own route-sketches, tracings of which latter have been kindly communicated to us for early publication.†

Of the earlier stages of this memorable expedition the 'Proceedings' have already rendered an account.‡ It will be remembered that Dr. Pogge and Lieutenant Wissmann left Hamburg for Loanda in November 1880, but that it was June 2nd, 1881, before they were able to get away from Malansh into the interior. They were accompanied by José Maria Germano, as interpreter, who was subsequently superseded by a black man, Biserra, a linguistic genius, who picked up a colloquial knowledge of Kiswaheli in the course of five days, whilst at Nyangwe. Finding the road to the Muata Yanvo's closed against them, they turned to the north. Their assurance that the Muata Yanvo had charged them to fetch Kahangula's head removed all obstacles which the Lunda chiefs on the frontier might otherwise have placed in their way, for they are accustomed to "commissions" of that nature, and not over-inquisitive as to the authority by which they are executed.

On October 2nd they arrived at Kikassa, on the Kasai, in lat. 6° 20′ S., and on the following day crossed that river into the Tushilange country, where they met Kingenge, a powerful chief, who was out with 200 men in pursuit of elephants. Kingenge readily promised to conduct them to Nyangwe on the Lualaba, and they started in his company. On the road they learnt, however, that Mukenge, another chief of the Tushilange, was a more powerful man. In order to conciliate him the two explorers separated, and whilst Lieutenant Wissmann continued

* For further information of this country, viz. about Adakhan and Goyum, and the road from Adakhan to Shiraz, see Captain Durand's 'Report on a Tour in Fars,' published in 1879.

† In laying down Lieutenant Wissmann's route on our map we have adopted the positions of Ginambanza's and Nyangwe as given on Buchner's preliminary map and Ravenstein's large map of Equatorial Africa, and adjusted it to the few latitudes already computed by the German explorer. Assuming these terminal points to be correctly placed, we have found that Lieutenant Wissmann's estimate of the distances travelled is only about 10 per cent. in excess of the truth.

‡ See 'Proceedings,' 1882, p. 678, with map.

with Kingenge, Dr. Pogge turned off to the left, and proceeded to Mukenge's town. The reception which the travellers met with among the Tushilange was exceedingly good. As "men come out of the water," or sea, they were looked upon as spirits of departed chiefs, come back to revisit the "glimpses of the moon," and all sorts of people were introduced to them as claiming kindred.

They finally started for Nyangwe on December 1st, 1881, under the guidance of Mukenge with fifty of his wives. The Lulúa, here flowing over a rocky bed of granite and not navigable, was crossed on the same day, and a densely peopled region of prairies was entered upon. On December 17th the travellers arrived at the Munkamba lake, which had been described to them as a vast sea, but turned out to be of very small extent, not being more than three miles in length. It is fed by springs, fringed by sedge and high grass, and has apparently no outlet. Its elevation above the sea is 2230 feet.

From here they made their way towards the Lubi, a tributary of the Lubilash or Sankuru, itself a tributary of the Congo. The Lubi forms the boundary between the Tushilange and the Basonge (singular Musonge). They had been previously struck by the great numbers of the wild Tushilange flocking around them by thousands, but Lieutenant Wissmann states that the Basonge were even more numerous. He speaks of the people as friendly, laborious, and highly skilled in all kinds of industrial art, and he brought away splendid specimens of their weapons, carved ivory, baskets, inlaid wares, and iron and copper utensils.

Leaving these interesting tribes and the fertile plains they inhabit, the travellers entered the vast virgin forests which extend as far as the Lubilash, a stream of the width of the Elbe. Lieutenant Wissmann mentions the total absence of fruit trees in this region, and consequently of game and birds. Only elephants and a kind of wild boar are met with at intervals. Reaching the Lubilash in 5° 7′ S. lat., they encountered fresh difficulties in the ill-will of the king of Koto, an old and much reverenced sorcerer called Kachichi, who rules over a medley of Luba tribes; he would not provide boats for crossing the stream, and it was only by intimidating him with shots and rockets that they induced him at last to produce the needful.

After crossing the Lubilash they passed through the kingdom of the Beneki tribe of whom Lieutenant Wissmann speaks very highly; he says that their villages are models, well built and clean, the houses surrounded by gardens and palm trees. They are an agricultural people, very numerous and well to do. Some of the villages took four and five hours to march through, and had one, two, and three rows of houses or streets; the population must number hundreds of thousands. From here they passed through the vast prairie lands inhabited by the tribes Kalebue and Milebue, densely populated parts which extend as far as the Lomami, also a tributary of the Congo, beyond which they crossed Cameron's track. The travellers suffered severely from the heavy rains—in fact

they could not have managed to traverse these swamps had they not been mounted on oxen—capital animals which they had bought at Loanda. Lieutenant Wissmann says that they jump like English hunters, canter and trot, and he much regrets having lost the last before reaching the East Coast, as they only live in West and Central Africa, and cannot stand the climate of the East Coast.

Nyangwe was reached on April 17th. Dr. Pogge started on his return journey westwards on May 5th, and left only three men with guns with his companion. The latter, however, met with ready assistance from Sheikh Abed ben Salim, an Arab, who furnished him with ten guns and fifteen carriers, with whom, on June 1st, he started for Lake Tanganyika. Repeatedly crossing the routes of previous explorers, he arrived at Plymouth Rock, a station of the London Missionary Society, on July 18th, where the Rev. Mr. Griffiths hospitably entertained him during a fortnight's stay. From this station he crossed the lake to Ujiji. Guns were few there and expensive, so that Lieutenant Wissmann was obliged to start with twenty unarmed carriers. This unpreparedness against a hostile attack nearly cost him dearly. The people of Uhha, who knew of his defenceless condition, lay in wait for him near the Malagarazi, and were preparing to put a stop to his further journeyings, when he bared his arm, and, pointing to a scar, shouted Mirambo! The word acted like magic. The death of a white man with whom the dreaded chief had exchanged blood would surely be avenged, and the intending plunderers desisted. Mirambo, whose capital Lieutenant Wissmann reached on August 31st, is described by him as "a capital fellow."

From Unyanyembe Lieutenant Wissmann paid a visit to the German station of Gonda, mainly for the purpose of getting a pair of boots, and finally reached the coast by way of Mpwapwa. He arrived at Saadani on November 15th, 1882, having spent twenty-two months and a half in his journey from coast to coast.

GEOGRAPHICAL NOTES.

A New Swedish Arctic Expedition.—The famous Arctic explorer Nordenskiöld, far from being content to rest on his laurels, is preparing for a new expedition this summer, of great difficulty and danger, to the east coast of Greenland. He has abandoned the idea, which he is known to have entertained, of revisiting the Siberian Sea, considering it likely that the Danish Expedition will be there this summer. The plan of the new undertaking is to sail along the Greenland coast as far as possible, and then to attempt a land journey of some hundreds of miles across the inland glaciers, it being hoped that the existence of oases of some kind will be proved in the midst of the enormous ice plateau. Nordenskiöld infers that oases exist from certain observations he made on a former journey to Greenland, and also from traces discovered by

one of the German expeditions. He believes that after passing the zone of ice-fields around the coast, the country beyond is entirely free from ice, and probably wooded, being warmed by the southerly wind, which reaches the interior as a dry wind. The eastern side of Greenland is still very little known, the country being wild in the extreme and flanked by rugged peaks which make it difficult to penetrate from the coast into the interior. It is stated by the Swedish newspapers that one of the objects of the expedition is to discover traces of the old Norse colonies of the middle ages, planted in 985 A.D., by Erik the Red and his successors, which were destroyed, it is supposed by an invasion of Esquimaux, in the fourteenth century after a flourishing existence of three centuries and a half. Baron Nordenskiöld does not, it is said, agree with Graah in fixing the sites of the colonies on the west coast, but is inclined to believe that they are to be found in East Greenland. The expedition will be equipped for all emergencies and will be accompanied by a staff of surveyors, naturalists, and other scientific men. It is to sail in May next; Mr. Oscar Dickson, the munificent and indefatigable promoter of all Arctic enterprise in Sweden, has offered to defray the cost, and the king is taking a lively interest in the project. Mr. Dickson intends to apply to the Swedish parliament for the grant of a gunboat for the expedition.

The Danish Arctic Expedition.—In our report of the meeting of the Swedish Geographical Society, at Stockholm, of the 16th December (p. 176), will be found some important remarks of Baron Nordenskiöld regarding the present position of the Danish expedition in the *Dijmphna*, which according to the latest direct news was frozen up in the Kara Sea in September last. Baron Nordenskiöld there expresses the opinion that the *Dijmphna*, as well as the Dutch meteorological expedition in the *Varna*, have gone on and reached their destination at the mouth of the Yenisei.

The Masai Country.—Mr. J. T. Last, of Mamboia, in East Central Africa, who had already made a successful journey through the Nguru country to the borders of the Masai, has on a second excursion (in November last) passed the border and reached some of the villages of this remarkable people. The part visited is near the most southerly limits of the wide extent of country inhabited by the Masai, and about 120 miles in a straight line from the coast at Pagani. He was upon the whole well received, and succeeded in gleaning much information regarding their physique, language, customs, social condition, and the best methods of dealing with them. The pure-blood Masai he describes as a fine race of people, the women especially very fine both in height and build. Their forehead is high, the lips thin, and the nose long and straight; but they are nearly black, and have short crisp hair. We hope to publish Mr. Last's account in detail in the next number of the 'Proceedings.'

Native Tribes of the Zambesi.—In the number for February 1883 of the 'Précis Historiques,' a French periodical published at Brussels, appears a contribution by Père Depelchin, of the Society of the Jesuits, leader of the Roman Catholic Mission on the Zambesi. In June 1881 he had reached the confluence of the rivers Chobe and Zambesi, and had opportunities of conferring with Messrs. Westbeach and Walsh, who have resided there for mercantile purposes a considerable time, and are well acquainted with the country, the people, and their language. Père Depelchin had with him a copy of Stanford's map of 1855, and Holub's contribution to the Journal of the Vienna Geographical Society 1879, and the same author's great work, 'Seven Years in South Africa.' It may be added that the Père is a man of experience as a traveller, having been eighteen years in India.—He maintains that the following tribes alone are found on the Zambesi in the neighbourhood of the confluence with the Chobe:—1. The Ma-Nansa or Ma-Kalaka, on the left bank of the Zambesi, opposite to the embouchure of the Daka and Matielsi. They were driven forward by the Ma-Tabele, and placed themselves under the protection of the Ba-Rotse. 2. The Ma-Laya, who extend from the frontier of the Ma-Nansa as far as the Victoria Falls. To the north of them are the Ma-Shukulombwe, a numerous and independent tribe, but harassed by the Ba-Rotse. 3. The Ma-Shubia are an important tribe, who inhabit the banks of the Zambesi as far as Shesheke, and of the Chobe as far as Linyanti. To them is intrusted the ferry over the river at the confluence. 4. The Ma-Totala, famous for their skill in working iron, are found to the north of Shesheke. This tribe is identified with the Ba-Nyeti, which name appears three times in Stanford's map; but this word means only "workers in iron," which is not the speciality of any one tribe. 5. The Ba-Rotse or Ma-Rotse, who are the ruling tribe, are established in the great valley which extends to the right and left of the river Malile. The kraal of the chief, Lebushi, is called Laroé. 6. The Ma-Ntchoia dwell in the north-east of the valley of the Ba-Rotse, and are partly independent, and partly pay tribute. 7. The Ma-Mbunda dwell on the left bank of the river Zambesi, betwixt the Ma-Ntchoia and the Ba-Rotse. Stanford, according to Père Depelchin, is wrong in placing them on the right bank. The Ma-Mbunda are still sufficiently strong as to cause serious alarm to their conquerors, the Ba-Rotse, who only last year thinned their numbers by a treacherous massacre. 8. The Ba-Libale are found to the north-east of the Ma-Mbunda on both banks of the Zambesi up to its source. 9. To the north of the Ba-Libale are the Ma-Pingula, a tribe resembling in character the Bushmen, and only partially subject to the Ba-Rotse. 10. The Ma-Hés possess the valley of the river Chobe from Linyanti up to the 6th degree of S. lat.—Such are the tribes who are subject to the empire of the Ba-Rotse. The Ba-Tonga, who dwell on the left bank of the Zambesi from the kraal of Wanki as far as Moemba, are a small independent

tribe.—Père Depelchin states that he went over the names of the twenty-four tribes mentioned by Holub with Mr. Westbeach, and found that the vernacular terms for professions had been entered as the names of separate tribes: e. g. the Fishers, the Hunters, and such-like appeared in the list as racial divisions. The Père was detained at Membwa, on the left bank of the Zambesi, the residence of the sub-chief Mgunba, before he was permitted to advance to the royal kraal of Lebushi, the chief of the Ba-Rotse, and he employed his forced leisure in acquiring the language, and confirms the oft-repeated assertion that, though each tribe had its own language, they all spoke the intruding Se-Kololo, the language of the former rulers, the Ma-Kololo, who, though they had lost their power, had left their language as the *lingua franca* of the country. He explains, also, that the Se-Kololo is a dialect, akin to the Se-Suto and Se-Chuana; for though the original Ma-Kololo were Ba-Suto, they incorporated members of so many other kindred tribes, that the compound dialect called Se-Kololo is intelligible to any one who knows the Se-Suto or the Se-Chuana. As a proof of this, he mentions that his own interpreter knew only Se-Chuana, and that when he asked the sub-chief Mgunba what the Se-Kololo language was, he instantly replied the Se-Chuana; and he knew it to be so, because one of his wives was a Ba-Mangwato from Shoshong, and her language and the Se-Kololo were the same. At the same time, so strong was the affinity to Se-Suto, that the Père remarked that all the religious and educational books published in Basutoland would be of use on the Zambesi. Brief as the empire of the Ma-Kololo had been, it had lasted long enough to stamp the new language on the country. The Ma-Kololo had passed away as a ruling tribe, but the Se-Kololo remained as a dominant language.

Mr. F. C. Selous, the South African traveller, has since his return to the field of his former adventures, made another journey through northern Matabele-land to the Zambesi. The greater part of the route he followed is quite new, and the map he has sent us, which we hope shortly to publish, will be an important addition to our knowledge of this part of the African interior. His track lay chiefly along the valley of the Hanyane or Panyame river, on his outward journey striking the Zambesi near the mouth of the Umsengaisi, then following the southern bank of the Zambesi to Zumbo, and returning to his hunting-camp, near the Umfule, by a southerly course crossing all the tributaries of the Panyame on the right bank. He suffered terribly during the return journey from hunger and fever, and from the attacks of the tsetse-fly.

Public Schools Prizes Examinations.—The examinations for the Royal Geographical Society's Prize Medals for the year 1883 will take place simultaneously at the invited schools on Monday the 19th of March. The special subject is "The Dominion of Canada."

REPORT OF THE EVENING MEETINGS, SESSION 1882–3.

Fifth Meeting, 29*th January*, 1883.—General Sir H. C. Rawlinson, Vice-President, in the Chair.

Presentation.—*The Rev. William Henry Penney.*

Elections.—*Charles Belton, Esq.; James A. Campbell, Esq.; Frederick Joel Crocker, Esq.; Oliver T. Duke*, M.D.; *William Greenwood, Esq.; Rev. James Henry Hancock; James Frederick Hutton, Esq.; Major William G. Knox; C. R. Lindsay, Esq.; James Leslie Main, Esq.; Robert Massie, Esq.; Evelyn Richard Hugh Pollard, Esq.; Charles W. Selwyn, Esq.; Henry Soltau, Esq.; George Crosland Taylor, Esq.; Horatio Warren, Esq.; Ernest Augustus White, Esq.; Robert Blake White, Esq.; Henry William Wimshurst, Esq.*

The paper of the evening was:—

"Itinerary Notes of Route Surveys in Northern Persia in 1881 and 1882." By Lieut.-Col. Beresford Lovett, R.E., C.S.I., H.M. Consul, Astrabad.

Published in the February number, *ante*, p. 57.

In opening the proceedings the Chairman (Sir Henry Rawlinson) said that in the absence of Lord Aberdare he had been invited to take the chair, and he had great pleasure in complying with the invitation, the more so as the country about which a paper was to be read, was one in the vicinity of which he had lived for many years under the shadow of Mount Damavand. Previous, however, to calling upon Colonel Lovett to read his paper he had two announcements to make: one was with regard to Mr. Leigh Smith, who had, in grateful acknowledgment of the assistance which the Society had afforded in promoting the relief expedition sent in search of the *Eira*, and also to mark the interest which he took in the progress of geographical knowledge, presented them with 1000*l.* for the purposes of general exploration. The other was the recent return to India of one of the native explorers whom the Survey Department of India was in the habit of sending out into countries which were inaccessible to English travellers. General Walker had sent to the Society a short account of the work of this explorer, which would be published in the February number of the Society's 'Proceedings' (*ante* p. 99). It would be seen that one of the results of this journey was the determination that the Sanpo and Irawadi were different streams, a fact of great importance to geography, and General Walker must be congratulated accordingly.

After the termination of Colonel Lovett's paper—

Colonel Champain said he had visited the tract which Colonel Lovett had described, but he should not have addressed the meeting if it had not been that their attention had been directed to Mount Damavand, the most important peak of the Elburz range. It was rather surprising to him that there was no absolute certainty as to its exact height. In the year 1862 he joined a scientific party of Italians who proceeded from Tehran with the view of scaling the mountain. The expedition was sent out by the King of Italy to the Shah of Persia. It included representatives of every branch of science: many of them came from the University of Turin, and though the mission was partly a diplomatic one, it was still more a scientific one. With about a dozen of those gentlemen he started in August 1862, and some of them succeeded in getting to the top of Mount Damavand. They were by no means the first to do so. Not only did the inhabitants of the villages about Ask go every year to the top to collect sulphur, but four or five Europeans, among them Sir William Taylour Thomson, and Mr. Ronald F. Thomson, our present Minister at Tehran,

had also been to the top. The expedition which he (Colonel Champain) accompanied reached Ask in about two days. They went as far as they possibly could on their mules, and ascended about 12,000 feet in that way. They slept there; and the next morning ascended on the south side, where the snows were more melted away than on the north. They were recommended not to wear boots, but ox-hide sandals with the hair outside, and there was no particular difficulty in the ascent; but out of twelve only five reached the top, the others being unable to withstand the rarefaction of the air, which was severely felt by all the party. The top of the mountain was a crater filled with snow. It might be said that the volcano was extinct, but there was a cave very near the top where the heat, a little way down, was very great, and there could be no doubt that the fires were still slumbering inside. He took a barometer with him and made what he thought were very careful observations all the way up, but to his great disgust when he reached the top he found that the barometer had only been made for registering the height of small mountains like Mont Blanc, and the quicksilver did not show at all. However, he compared it with the instruments brought by the Italians, and found what his barometer ought to have marked, and calculated accordingly. His calculations were very nearly the same as those which the Italians worked out later, and they made the height of the mountain 19,260 feet. Since then other gentlemen had ascended the mountain. One friend of his went up and could not get down the same day. Eventually he found the hot cave and spent the night there. He (Colonel Champain) crossed over the spurs of the mountain about two years ago when he marched from Meshid-i-Sir to Tehran, a distance of 170 miles. After passing Barfrush the road became an excellent one nearly into Tehran. There was a lack of villages on the road, and twice he and his friend had to sleep in the open air. However, the nights were very fine, and they did not suffer at all.

Colonel C. E. Stewart said that he had the pleasure of accompanying Colonel Lovett on his journey back from Persia, and had travelled over a good deal of the ground shown in the map before the meeting. He had first tried to meet Colonel Lovett at Shahrud, but found he had just gone to Astrabad. After proceeding to Tehran, and Resht, he embarked on a Russian steamer at Enzelli, the port of Resht, and went to Bandar Gez, at the south-eastern corner of the Caspian, but here also he missed Colonel Lovett, as he had left by a steamer two days previously for Baku. The steamer in which he travelled had, in fact, crossed that in which Colonel Lovett had embarked. From Bandar Gez he went to Chikishliar and Krasnovodsk on the eastern shore of the Caspian Sea, and crossed over from Krasnovodsk to Baku on the western coast. At Baku he at last met Colonel Lovett and they had a very amusing journey together to Tiflis. The railway was not completed, but the Russian governor most kindly supplied them with tickets gratis to travel by a train conveying materials. They were told to be at the station by 11.30 A.M., and they entered the train about that time, but the train did not start until about six in the evening. It began by moving about four miles, and then stopped dead for a long time. In the night they ran into a truck full of water which was standing on a very rickety bridge, which had been put up as a temporary expedient, and the collision very nearly brought down the bridge, but not quite. The engine took a rest on one occasion of twelve hours to be cleaned. The train was so crowded that one of the passengers tried to find a place in a van constructed to carry naphtha, and which was full of that liquid. At last, after being nearly four days and nights in a very crowded third-class carriage, they were delighted to find themselves close to Tiflis. Colonel Lovett then threw the provisions they had brought with them out of the window. The train went on a little further, and then suddenly stopped, remaining for many hours, so they had to walk back along the line and look for their discarded provisions, and were

only too glad to recover what they had considered stale and unfit to eat. After leaving Tiflis, they crossed the Caucasus in a diligence. The road over these lofty mountains is a splendid monument of Russian engineering skill. Mount Elburz, the highest peak of the Caucasus, is considerably higher than Damavand. There seems little doubt that the Caspian had at one time a much greater extension than it has at present. The southern and eastern coasts are very low, and a rise of a few feet would flood a large extent of country. On the eastern shore, between Chikishliar and Krasnovodsk the coast is so low, that when a strong westerly gale prevails, the sea floods a considerable extent of country which is usually dry. He believed that a portion of the Kara Kum Desert was once the bed of an inland sea which was probably connected with the Caspian. Mr. Lessar, the Russian engineer who has taken levels for the line of railway that is proposed to be made from Kizil Arvat to Sarakhs, and who is the best authority on this subject, says that there is little or no rise in the elevation of the land from the Caspian, and that he believes that if levels were taken, many localities would be found in the trans-Caspian desert lower than the Caspian. That the level of this sea has varied very much, even in historical times, we have abundant evidence. He had heard of a boat and some anchors found buried seven miles from the present coast. The Caspian contained seals and many other animals which are only found in Arctic or very cold regions. The fish of this sea are more Arctic than the position of the sea would at all warrant.

General Sir Frederic Goldsmid said that he had had the pleasure of travelling with Colonel Lovett from Sharud to Tehran by the lower country, but he had not penetrated the hills. With regard to Russian merchants being found in various parts of Persia, he thought that could be very easily accounted for by the proximity of Russia to Persia. If Russian Tiflis were English Manchester, and Astrakhan were Glasgow, he was quite certain that they would see the country overrun by Englishmen and Scotchmen in all directions. He only wondered that there were so few Russian merchants in the north of Persia. Perhaps if British India had been contiguous to Persia, which it might have been not long ago, there would have been a good many more Indian traders in Persia than at present.

The Chairman (Sir Henry Rawlinson) said he had some personal acquaintance with the country described, but had very little to add to what Colonel Lovett had so graphically stated. The description given in the paper was very accurate, and in many respects very interesting. He had not followed the circuitous track which Colonel Lovett had made through the mountains, but he had travelled by the direct route from Tehran through the hills to Chardeh many years ago, in company with Sir Henry Bethune and the Persian army under the command of the Shah, when marching against the Turkomans. He had, however, no particular recollections of the country which would entitle him to criticise Colonel Lovett's remarks. He was much struck with the fact that a large plateau filled with oyster-shells had been discovered on the top of the mountains. Of course there must have been an enormous upheaval there; the oyster-shells must have been deposited when that particular locality was under water, and the height at which it now was made it a very surprising instance of elevation. The shores of the Caspian, however, were notoriously in a constant state of elevation and depression. The city of Abiskun, for instance, which was at one time a flourishing place near the mouth of the Gúrgán, was afterwards submerged 50 feet under water; then it came up to the surface again, and the remains were still visible at Gumishteppeh. It was that particular phenomenon of spontaneous elevation which appeared recently to have led the Russians to despair of ever getting the Oxus water back again to the Caspian. For some time it seemed to be a very easy operation, but now that they had surveyed the whole line and taken the levels, they were beginning to despair, and

did not think they would ever be able to keep up a continuous stream of water from Urgenj to the old mouth of the river. As for the Caspian having at one time extended somewhat to the east, very possibly that was so. The Oxus formerly ran into it by two or three different arms, and there was probably a large lake, the Aria Palus, some 300 or 400 miles inland, but certainly the sea had not in the historical period ever penetrated to that distance. In fact there was a considerable range of hills, the Little Balkan, running up to the old bed of the river from the great range of the Akhal and Turkoman country. And how the sea could have got over that range it was difficult to see. To an historical ethnologist the country through which Colonel Lovett had been travelling was of very great interest. It was the region in which the Magian religion took its later form, being the link between Bactria on the one side and Azerbiján on the other. Here dwelt the old Median Magi, and from here the religion of Zoroaster penetrated into Azerbiján, taking its particular form in the Elburz Mountains. The capital of the country was, indeed, the very city which Colonel Lovett had mentioned under the name of Firuzkuh. In ancient times that city was called *Ustúnawend*, taking its name from Osthanes, who was the successor of Zoroaster, and who accompanied Xerxes in his expedition to Greece. He was the chief Magus, and that title under its Persian form of *Mazmaghán* was retained by the chiefs of the country up to the time of the Arabian conquest. The region about Mount Damavand was quite a sacred name in the Bundehesh, the book of the old Zoroastrians, and it would be very interesting to thoroughly examine the present locality of Firuzkuh. He had been over the fort himself, and he believed Colonel Lovett also had, and he had seen enough to show him that it required a great deal of examination. There were, for instance, a number of caves in the hill on which the fort stood which would be well worth examining, and Major Napier heard of rock inscriptions in the bed of the river close by. The city of Firuzkuh was the place from which a colony went out, and founded the famous city of the same name in Afghanistan, the inhabitants of the Hari-rud valley being called Firuzkuhis at the present day. In the Zendavesta these great mountains were called the Hara-berezat, which had been corrupted into Elburz. The word meant "the lofty mountains," and was applied to the sacred lands of the old Zoroastrians. This was a subject which probably hardly came within the scope of the Geographical Society, but as it gave an additional interest to the country which Colonel Lovett had described he had thought he might venture to make these few observations.

Sixth Meeting, 12*th February*, 1883.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*Elliot Angelo, Esq.; William Campbell, Esq.; Charles A. W. Dickinson, Esq.; Devereux Alfred R. Evance, Esq.; Major J. A. Stewart Mackenzie; William H. Neale, Esq.*

The following paper was read:—

"Mr. B. Leigh Smith's Second Voyage in the *Eira* to Franz-Josef Land."

In the absence of Mr. Leigh Smith the paper was read by Mr. W. H. Neale, M.E., Surgeon to the *Eira* Expedition. It will be published, with discussion and map, in the next number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—February 2nd, 1883: M. DE QUATREFAGES (of the Institute) in the Chair.—A letter from the Société de Géographie Commerciale de Bordeaux, reminding the Society that at the Geographical Congress held last year in that town, it was decided that a certain number of resolutions, adopted by that congress, should be submitted for consideration to all the French geographical societies, and therefore claimed the attention of the Geographical Society of Paris. Among these resolutions, one was mentioned relating to the establishment of a periodical to be the common organ of all the French geographical societies; another, referring to the admission of delegates from the above-mentioned societies to the meeting of the learned societies, which is held every year at Easter, at the Sorbonne, under the auspices of the Minister of Public Instruction; and a third, regarding the formation in each geographical society of a permanent section, which, during the intervals between the meetings of the International Geographical Congresses, should apply itself to the consideration of all important questions, and work towards a common end.—The Minister of Naval and Colonial Affairs forwarded several pamphlets by MM. Dr. Neiss, A. Gautier, Septans, and Gaurroy, published in Cochin China, and having reference to the country of the Moïs.—The Crown Lands and Immigration Office, at Adelaide, in the province of Victoria (Australia), transmitted a collection of maps, lists, and statistical documents relative to that colony.—M. Alfred Firmin-Didot, head of the well-known publishing firm of that name, in forwarding to the Society the edition of the 'Geographie de Ptolémée' published by his father from the manuscript of Mount Athos, stated that in the "Bibliothèque des Classiques Grecs," published by his firm, there will appear the most complete edition of Greek Geography, in three volumes, one of which will be for maps; M. Müller, the Greek scholar, has, it appears, been working at it for fifteen years.—M. Léon de Rosny, Professor at the School of Oriental Languages, presented the Society with an orographical map of Roumania, which he has published, together with the orthography of native names, the results of a journey in that country.—M. Romanet du Caillaud, author of a work on Tong-King, which the late M. Gambetta was engaged in reading at the moment of his death (for the book was found open on his study-table), having examined a map published in the 'Mittheilungen' of Leipzig (1881), and another, which is in Petermann (1873), stated that the Sino-Annamite frontier there traced is in contradiction with the maps published by the Jesuit Fathers in the eighteenth century from Chinese documents. He instanced especially the village of La-Fou, which the German maps just mentioned place in the middle of the Chinese territory, whereas from 'Les Lettres édifiantes et curieuses des missionaires' (eighteenth century), it appears that this place was a tributary of the crown of Annam, as well as of the rest of China. He went on to point out that this subject is important now that France is about to give proof of her authority at Tong-King.—It was announced that the Rogozinski Expedition to Africa, which has started to explore the Liba Lakes, had embarked at Havre on the 13th December, 1882, its destination being the island of Fernando Po. The vessel which conveys it, *La Lucie Marguerite*, a lugger of 100 tons burden, should have called at Madeira, but the Paris correspondent of this expedition writes that, not having received any news dated from that island, he supposes that the expedition has made straight for Santa-Isabella, the port of Fernando Po. He does not expect any more news for a month or six weeks.—By a letter dated St. Louis (Senegal), 8th January, the Society was informed that Dr. Bayol, who started for Haut-Galam on the 14th November, 1882, in company with M. Noirot, had arrived on the 26th at Saldé, where he had quitted the despatch-

boat, which had conveyed him up to that point. From that time no news has been received from him.—About the end of January 1883, a communication was received from South America to the effect that M. Thouar, who intends to explore the Pilcomayo, commencing from its source, had arrived at Medellin on the 12th December, 1882; that from there he was going to Santa Fe de Bogota, then to Quito; that, after a short stay in each of these two towns, he was to have continued towards the south, skirting the Andes, as far as Chuquisaca, where his real journey will commence.—Colonel (now Major-General) Venukoff intimated that General Tillo was about to publish shortly the works of the late M. Smirnow under the form of an isodynamic map of European Russia; that he (General Tillo) was at work upon a catalogue of altitudes of 4000 stations on the Russian railways, to correspond with his atlas of the sections of these railroads, which was honoured with a gold medal at the Venice Congress. Also that Colonel Barabasch, in the course of his expedition in Manchuria, has made many topographical surveys and interesting researches on the geography of the slopes north and east of the Tchan-pè-Tchan, which are at present so little known. Lastly, the writer described the progress of steam-navigation in the basin of the Obi, where as many as fifty steam vessels could be counted in 1882, whereas in 1854 there were but two.—M. René Roy, who generally concerns himself with the polar regions, presented translations of two letters received from Lieutenant Wissmann, who has just accomplished a journey across the African continent. The first of these letters is dated from Kidimba, 6° 8′ 40″ lat. S., 22° (?) long. E. (not yet calculated), 17th November, 1881; the second was written from Cairo on 5th January, 1883. From these letters it appears that, on the 29th January, 1882, the traveller had crossed the Lubilash, 5° 13′ lat. S., and at the same time the Sankuru, for he had learnt there that these are one and the same river, which has a different name on the east and west banks. This river is 500 feet broad and flows quietly between banks of sandstone, then, when the valley widens, it traverses dense forests as far as the Congo. The sources of the Sankuru are the Lubiranzi and the Luvembi. From Lubi to Tanganyika Lieutenant Wissmann found a degraded race of people called Batua, who with their thin bodies present a hideous appearance. They are destitute of culture and industry, the use of iron being unknown among them except for pointing their arrows. The Lusubu is not identical with the Kazubu as Stanley had stated. The traveller made an excursion of several days to the Lukuga river, which enabled him to settle the uncertainties relative to this interesting watercourse, so often spoken of. Lastly, M. Wissmann had a most cordial reception from the chief Mirambo, who ordered an ox to be roasted and two bottles of champagne opened in his honour.—In conclusion, a letter was read from Dr. Ch. Colin, naval surgeon in the Western Soudan. The doctor formed part of the Derrien mission to Senegal. His communication was chiefly an explanation of the photographic views which he has brought back with him, and which were exhibited to the audience by means of oxy-hydrogen light, the views representing the scenery and general features of the country.

——— February 16th, 1883: Dr. Hamy in the Chair.—The Chairman announced that only one of the resolutions which were adopted at the Bordeaux Congress and had to be submitted for approbation to the French Geographical Societies, had been approved of by the Central Commission of the Society of Paris, viz. the one concerning the establishment of a geographical section at the congress of the learned societies, annually held at the Sorbonne about Easter-time, under the presidency of the Grand Master of the University. It was then announced that the general meeting of the Society for the distribution of prizes would be held in the second fortnight of April, when gold medals would be awarded to the Gallieni and Derrien missions, and the Roquette prize to Lieutenant Schwatka, for his explorations in King William's Land. The Chairman also announced the opening

of an exhibition at the Museum of the Trocadero, organised by M. D. Charnay, and comprising the impressions and mouldings of the monuments visited by him in Yucatan.—M. Ch. Gauthiot read some news from Senegal extracted from letters dated January 17th and 23rd, from which it appears that the works of the St. Louis-Dakar Railway are actively proceeding, and that in less than three years the line will be opened for traffic. The king of Cayor having refused to allow the railroad to pass over his territory, it had been necessary to make a military demonstration, which had been successful. Forts will be erected to protect the works. Also, that Colonel Borgnis-Desbordes had taken possession of Murgula, which he had declared a free town, and independent of Ahmadu; the people had accepted all the conditions imposed upon them.—A communication was received from General Venukoff relative to several expeditions now preparing in Russia. In the first place, there is a hydrographical expedition, its destination being the Gulf of Obi; another, which will be directed by Colonel Prejevalsky, who has given up his journey to Eastern Turkistan and Tibet, will start to survey the frontier between Siberia and Mongolia, which had been fixed 155 years ago, but was a little uncertain and vague. The writer further states that a canal is to be excavated shortly between the affluents of the Obi and those of the Yenisei in order to establish water communication between these two rivers. There will then be in Siberia a water-way extending from Tiumen to Kiakhta, a distance of 2796 miles. Unfortunately, however, navigation there will never be possible for more than 125 days in the year.—M. Lessar gave some information about his last journey in the mountains of Dereghez and Kelat, of which he is preparing a detailed description; he hopes to be able to set to work and finish his map of Turkomania.—Dr. Montano, who has been invited by the Toulouse Geographical Society to read a paper on his travels in Oceania, presented the first numbers of the bulletin of this Society, which he was commissioned to offer to the Society of Paris. The Society of Toulouse has only been established eight months, and already numbers 540 members. M. J. B. Paquier, Secretary of the Society, explained the cartographical processes which M. Eugène Guillemin has employed in preparing his relievo-map of France; the map was on view in the hall. This method has the double advantage of being scientific and at the same time expressive. As regards specially the representation of the relief of the ground, it is not often that either geographical or topographical maps present this characteristic. The remarks made by M. Paquier on this subject will be inserted in the report of the meetings.—M. G. Depping, in the name of M. R. Cortambert, who was unable to be present at the meeting, read a letter (sent in November 1882) to M. Cortambert by a French naturalist, Mr. L. Petit, who has been settled several years at Landana (on the western coast of Africa), where he is collecting natural history specimens. During the months of July and August the writer had made an excursion into the upper parts of the river Chiloango, which is sufficiently navigable from the coast of Loango as far as Gouinge or Gouinege. Toumby, where the traveller halted, is a village of considerable importance, situated upon an eminence in the midst of mountains and thick forests. M. Petit was present at the funeral rites of a native chief who had been dead a year, and whose body had been preserved since that time in his dwelling, fumigated and wrapped in bandages. The prince of the country, he says, is only buried when his successor is nominated. The body, inclosed in an immense case covered with stuffs, was lowered into a spacious grave. The traveller was told that one of the eight wives of the deceased, who had been accused of adultery, had, after the death of her husband, been buried alive; also that in this same district run-away slaves, when caught, are burned alive. M. Petit had collected several specimens of gorillas, and was about to start upon a hunting expedition in pursuit of this animal, about which he promises to send some accurate information. The

gorilla is not, according to him, so terrible as we had been led to believe. The animal inhabits the district of Loango only, and is found in a series of forests running parallel to the coast.—M. Virlet d'Aoust offered some observations on the orthography of geographical names; he referred to the geographical and statistical dictionary by Adrien Guibert, published thirty years ago, which preserves the original orthography of the names of countries and towns.—M. A. Bellot, naval lieutenant, brother of M. René Bellot, who perished, as we know, in an Arctic expedition sent in search of Sir John Franklin, read a full account of the expedition of the *Jeannette*, to which he added some information on the circumpolar stations.* M. H. de Bizemont, captain of a frigate, remarked that the ship *Jeannette* had arrived full late at Herald Island, and that that had been the weak point of the expedition. However, the route had been well chosen, and there would be perhaps cause to make the attempt again, care being taken to establish first of all a provision depôt, either at Herald Island or at Wrangell Island.—A discussion then arose upon this subject between MM. A. Bellot, de Bizemont, René Roy, and Maunoir, which terminated the proceedings.

Geographical Society of Stockholm.—December 16th, 1882: Commander Aug. Fries, President, in the Chair.—The President announced that the Society had received an invitation from the Italian Geographical Society to participate in the discussion of the International question of an initial meridian for calculating longitudes as well as time. A committee, consisting of Professors Nordenskiöld and Gyldén, with Consul Elfving, had been appointed, and they had commissioned Professor Gyldén to draw up the Society's report.—Professor Gyldén made some observations on equidistant mean time.—Professor Nordenskiöld then delivered an address on the probable whereabouts of the *Dijmphna* and the *Varna*. The speaker commenced by mentioning the expeditions which for different purposes had entered the Kara Sea during the year. They were, firstly, the *A. E. Nordenskjöld*, belonging to M. Sibiriakoff, with a cargo of merchandise for the Yenisei, and the *Varna* bound for Port Dickson, with the Dutch Meteorological Expedition on board; and lastly, the *Dijmphna*, commanded by Lieut. Hovgaard, who intended first to proceed to the mouth of the Yenisei, then follow the coast to Cape Chelyuskin, and at last attempt to penetrate northwards along the east coast of Franz-Josef Land. Some other vessels had also visited the seas around Novaya Zemlya during the summer, among which were those sent from England for the rescue of Mr. Leigh Smith and his party. As was generally known this gentleman had been compelled to winter at Franz-Josef Land, and at a point further north in the eastern hemisphere than any previous expedition. Up to that time the Swedish Expedition of 1872–73 had wintered furthest north in this part of the world. The winter had passed very happily; while, without the loss of a single life, the gallant explorer had penetrated with boats the ice-floes between Franz-Josef Land and Novaya Zemlya to Matotshkin Straits, where the party was met by Sir Allen Young, sent to its rescue. Mr. Smith's journey from Franz-Josef Land to Matotshkin Shar in boats showed that the sea must have been very free from ice north of Novaya Zemlya during 1882, while, according to statements made by Russian whalers, the sea south of the Waigats and Kolgujeff Islands to the Petschora had been more full of ice than during any of the last thirty years. This was the cause of the unsuccessful attempts of the *Nordenskjöld* and the *Louise* to bring merchandise to the Siberian rivers. The first of these to return was the *Nordenskjöld*, which was commanded by Captain H. C. Johannesen, who had charge of the steamer *Lena* to Yakutsk in the *Vega* Expedition. Captain Johannesen had had several accidents on board, and after battling with the ice all the

* See the notice with his map in the quarterly *Bulletin*.

summer, returned in September to Norway. From the 8th to the 16th August he had been in the company of the *Dijmphna*, while both were trying to get into the Kara Sea through the Waigats Straits. Later information of the *Dijmphna*, as well as the *Varna*, was brought by Captain Dallmann, of the German steamer *Louise*. He brought a report from Lieutenant Hovgaard, dated September 22nd, in which he stated that the *Dijmphna* had succeeded in reaching the Kara Sea, by the Kara Gate, and was proceeding in an open "lead" along the coast, when he observed two vessels fast in the ice, and in consequence of guns being fired from one of them, which were taken for signals of distress, he went to their assistance and penetrated into the pack. During the night this began drifting, and the vessel became ice-bound. Lieutenant Hovgaard, in conclusion, stated that had he not been thus led to leave open water, he would without difficulty have reached Port Dickson, his winter-quarters. The two vessels were the *Louise* and the *Varna*. The speaker then proceeded to state that lately alarming rumours had been spread by the Russian press relative to the safety of the *Dijmphna*, in one case to the effect that the vessel had been seen by Samoyedes in the ice, in another that a wreck, believed to be that of the *Dijmphna*, had been discovered on the coast of Siberia; but through the Swedish Ministry for Foreign Affairs, he (the speaker) had been informed that the former of these reports referred to the position of the *Dijmphna* on September 2nd, thus twenty days *before* the date of Hovgaard's last despatch, and the latter to the wreck of a whaler. Since, therefore, the *Louise* had parted from the two vessels no news, whether direct or indirect, had been received of the fate of these expeditions. Still there was not the least occasion for any apprehension; on the contrary, there was every reason to presume that both vessels had safely reached Port Dickson, as it was not likely that the narrow belt of drift-ice between the vessels and the open "lead" by the coast could keep them ice-bound for any length of time. Most probably they had got free a few days after the departure of the *Louise*, and continued their journey to Port Dickson. And should any of the vessels have become wrecked in the vicinity of where they were situated on September 22nd, the party would undoubtedly have reached the Russian coast near the mouth of the Petschora in safety; and from this place information of the calamity would have come to hand ere this. If the vessels had reached Port Dickson, information of the circumstance could, even if an express had been despatched to Yeniseisk, not reach Europe until the middle of January.—The Secretary, E. N. Dahlgren, Esq., exhibited two maps presented to the Society, one of North Europe 12,000 years ago, by Mr. E. Hansen-Blangsted, showing the probable division of land and sea at that period, and another of North Formosa, drawn by Mr. J. W. Patterson, a Swede, who during four years was a custom officer in the island while in the Chinese service. He also laid before the members a photo-lithographic facsimile of the oldest known special map of Scandinavia. The original is inserted in a Latin MS. of the 'Geographia Ptolemæi,' belonging to the municipal library in Nancy, and which had been lent for the purpose of reproduction. The MS., remarkable for its neatness, had been executed at the command of Cardinal Guilielmus Filiastrus (A.D. 1428). The text states that the maps in the MS. were drawn from Greek originals, but, in order to fill a hole in the latter, he had specially commissioned (in 1427) a Dane, Claudius Clavus, to draw a map of Scandinavia, with explanatory text. The map, which is distinguished by being far more correct than those drawn of Scandinavia, Greenland, &c., at a later period, will be published in a work by Professor Nordenskiöld now in the press.—The Council for 1883 was elected as follows:—President, Dr. O. Montelius; Vice-President, Consul N. A. Elfving; Secretary (for three years), E. W. Dahlgren, Esq., address, Kongl. Biblioteket, Stockholm; Members of Council, Professors Nordenskiöld, Düben, Hildebrand, and Key, Drs. Stolpe, Tegnér, Warn, Commander A. Fries.

——— January 12th, 1883 : Dr. O. Montelius, President, in the Chair.—In opening the meeting the President announced that the reports of the Society's proceedings for the period 1878–1883 were now ready from the press in a complete form. Captain N. Selander next exhibited the last sheets which had appeared of his map of Sweden, and pointed out the latest alterations which had been effected by the recent topographical measurements; the geographical position of many places in Jemtland having, on previous maps, been placed from one to three miles (English) too far east or west. [Note : In our report of the meeting of October 20th, 1882, vide 'Proceedings,' vol. v. p. 48, it was wrongly stated in the copy sent to us, that the Island of Gotland had been discovered to be 160,000 feet too far from the coast. It should have been 16,000 feet.] Consul N. A. Elfving then read a paper on De Brazza and Stanley's journeys in Africa.—Dr. Montelius, the President, communicated the results of his archæological researches in Oestergötland and Skåne last summer. In the former province he had examined a newly discovered grave of the stone age, being remarkable, as very few such relics had been found there, although many had been met with near the lake Vettern, which part he therefore believed to have been the first inhabited in the country. In Skåne he had examined some very interesting remains belonging to the stone age, which had come to light by the artificial sinking of the lake Ringsjön, and also a grave of the bronze age, found near Lund, which was an illustration of the burying of bodies in oaken coffins, whereby the clothes of the dead had remained in good condition even to the present day. In conclusion, Dr. B. Christiernsson, Swedish-Norwegian Consul in Shanghai, made some observations regarding the Chinese.

Société Khédiviale de Géographie de Cairo.—After the restoration of peace in Egypt the above Society recommenced its operations. The first meeting was held on the 3rd November, 1882, when the Society entered upon the eighth year of its existence. The President, General Stone, having delivered his opening address, formally distributed the diplomas and medals gained by Egypt at the Venice Congress.—M. Pietri then gave an account of the Gallieni Expedition to the Niger, and the General Secretary, M. Bonola, a résumé of the Arctic events of the year, adding some details on circumpolar meteorological stations.—A second meeting was held on the 8th December, when Dr. Schweinfurth gave a lecture on questions of African hydrography relative to the basins of the Congo and of the Uelle, and a sketch of the travels of MM. Pogge and Wissmann, and of MM. Junker and Cajati. —General Stone, President, then read a memorandum on the services rendered by Egypt to African geography, especially by the expeditions of the General Staff. He gave details of all these expeditions, pointing out the special importance of each, the territory discovered or verified, and the sacrifices of men and money which these expeditions have cost the Government.—In conclusion, M. Zigari read an obituary notice of the late Marquis Antinori.—The third meeting, which was held on the 19th January, 1883, was convened to do honour to Lieutenant Wissmann, who had arrived at Cairo after his journey across Africa, and for the installation of the new President, General Stone having sent in his resignation and left Egypt. His Highness the Khedive had, in accordance with the terms of the statute, appointed as President of the Society His Excellency Ismail Pacha Eyoub, Honorary Member of the Society, formerly Governor-General of the Soudan, and now Minister of the Interior.—The new President, in taking his chair, delivered an appropriate address, which received great applause. M. Wissmann then spoke and described the principal phases of his famous journey.—In conclusion, M. Schweinfurth made some observations on the said journey. — All the meetings were well attended, the hall overflowing with people, among whom were many ladies and officers of the army of occupation.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

[Balearic Isles.] Die Balearen. In Wort und Bild geschildert. Vierter Band. Die eigentlichen Balearen. Leipzig (Brockhaus): 1882, imperial 4to., pp. 309, map, plans, coloured illustrations, woodcuts.

This volume forms part 2 of Book 3, devoted to Mallorca (see 'Proceedings,' 1881, p. 318, for preceding volume), and contains the following divisions:—1. On the City of Palma; 2. On its harbour; 3. On the ordinary aspects of life of its inhabitants; 4. On the country in its immediate neighbourhood. Many of the larger coloured illustrations, which are from sketches by the illustrious and anonymous author, the Archduke Ludwig Salvator of Austria, are of remarkable excellence, especially when the levelling process of chromolithography is taken into consideration; of these, that representing the Puerto del Mulinar de Levante must be especially noticed. The first subdivision, which describes and figures the numerous objects of archæological and architectural interest in the city of Palma, is the fullest in treatment; and here also it is impossible to avoid some expression of praise for the admirable way in which the engravings combine definition of detail and breadth of treatment. The map is a reproduction of Antonio Garav's representation in 1644 of Palma and its environs.

Den Norske Nordhavs-Expedition, 1876-1878 [The Norwegian North-Atlantic Expedition, 1876–1878]. Christiania (Grøndahl): 1880–82, imp. 4to., maps, plates. (*Sampson Low & Co.*)

Part VIII. of the valuable General Report of the above-named Expedition having just been received in the library of the Society from the Editorial Committee, the opportunity may be taken of noting here the progress of the work and the nature of the parts already published. The publication, for which a grant of money has been obtained from the Norwegian Storthing, is conducted under directions from the Government, and especially appeals to English readers, as the Expedition of which it gives the results is avowedly based on British models, and the Report itself is printed in double columns of Norwegian and English (translated by John Hazeland).

The different memoirs of which it consists are distributed immediately on leaving the press, and with no regard to order. The following have as yet appeared:—

No. IV. 1. Historisk Beretning; 2. Apparaterne og deres Brug [1. Historical Account, pp. 46, map; 2. The Apparatus, and how used, pp. 54, frontispiece and illustrations]. By C. Wille, Captain of the Royal Norwegian Navy. 1882.

The first portion of this No. recapitulates the memorial presented by Professors H. Mohn and G. O. Sars in 1874 to the Norwegian Government, in which the conviction is urged that the means to comprehend and explain the physical and biological conditions peculiar to Scandinavia must be sought chiefly in a thorough exploration of the sea stretching between Norway, the Færoe Islands, Iceland, Jan Mayen, and Spitzbergen, constituting a wide basin wherein the warm water of the Atlantic meets the cold indraught from the Polar Seas. Former observations, both of a meteorological and physical nature, are briefly discussed, resulting in the certain assumption that Norway is indebted to the physical conditions of her adjacent sea-bottom and the corresponding oceanic currents, for her existence as a habitable and civilised country; and the advisability of a correct knowledge of these conditions is set forth, not only from scientific points of view, but as being likely to throw light on meteorological and other influences of economic importance, especially with regard to the staple industry of herring fisheries. This memorial resulted in the chartering of the steamer *Vøringen*, the appointment of officers and scientific staff (Professors Mohn and Sars, Dr. Danielssen, Mr. Friele, Mr. Svendsen, and an artist,

Mr. Schiertz), and the drawing up of a scheme of operations; and the Expedition left Bergen on June 1, 1876. After some coasting experiences, the ship steamed west to the Færoes and Iceland, but the season was too far advanced for a circumnavigation of the latter island, and she returned to Bergen at the end of August. A second start was made on June 11, 1877, Mr. H. Tornøe taking the place of Mr. Svendsen, and after a series of operations on and off the coast, Jan Mayen was reached on July 28, and left on August 3, the return to Bergen being made on August 23. The soundings between Røst and Tromsø disclosed the important fact that along this line the basin of the Arctic Ocean cuts deep into the bank, forming an edge as at Stor-Eggen, off the coast of Romsdal. This edge, named Vesteraals-Eggen, is about 240 miles long, being at its northern extremity not more than 12 miles from land. The fish frequenting it are of the same species as those found on the Stor-Eg, and it is apparently better suited than the latter for the establishment and working of fisheries. In the middle of June, 1878, the third voyage was commenced, and after touching at Hammerfest and Vardø, the *Vøringen* made for Beeren Island (where the altitude of Mount Misery was determined by trigonometrical observations), returning to Hammerfest and unconsciously passing within a few miles of the *Vega* on her outward journey. The final start for Spitzbergen was then made, and after landing on Beeren Island by the way and collecting birds, fossils, and plants, the South Cape was reached on August 5, and the Norway Islands on the north-western coast ten days later. One sounding of 1343 fathoms made during this part of the journey is of especial value, as corroborating the work of the Swedish Expedition in the *Sofia* in 1868, under Nordenskiöld and Von Otter. An extraordinary quantity of fish was found in the sound between the Norway Islands, three boats with two men each being able to catch and pack as many as 2200 cod in twenty-four hours. The return voyage was made along the west coast, the land at Advent Bay being specially noticed to differ from all other parts of Spitzbergen visited by the Expedition, in presenting no glaciers in its valleys; and Bergen was reached on September 4, the entire expense of all three voyages being about 14,000*l*.

The accompanying map shows the whole of the various courses of the ship during 1876–78, with stations and dates.

The second part contains technical descriptions with well-executed illustrations of the ship and the sounding- and dredging-apparatus and methods of working, with tables of soundings at 375 stations, showing position, depths, and bottom; and concludes with an account of the method of taking astronomical observations, and of the instruments employed.

No. V. 1. Astronomiske Observationer, pp. 23, by H. Mohn; 2. Magnetiske Observationer, pp. 30, woodcut, by C. Wille; 3. Geografi og Naturhistorie, pp. 36, maps, coloured plates, and woodcuts, by H. Mohn. 1882.

The first part of this No. contains details of the astronomical observations made in some of the harbours at which the Expedition touched, chiefly to serve as a basis of the time- and azimuth-determinations required for the magnetic observations, but with the secondary object of determining geographical positions in Jan Mayen and Spitzbergen, and of verifying longitudes on the northern Norway coast by means of telegraph time-signals. Observations are recorded from Husø, Reykjavik, Namsos, Bodø, Røst, Hammerfest, Vardø, Advent Bay, and Jan Mayen. Differences in the received positions are suggested in many cases.

The second part in like manner discusses the magnetical observations, giving separately those taken at land stations and those made at sea, and concluding with tables of the observations and their results at Vestfjorden, Bergen, Øst- and Vest-Finmarken, the Norwegian Sea, South Cape, and the Greenland Sea, with synoptical table.

Professor Mohn's beautifully illustrated "Contributions to the Geography and Natural History of the Northern Regions of Europe," which constitute the third part of this Number, are naturally the most interesting portion of the work from a geographical point of view, and would apparently deserve separate publication for the advantage of general readers. He describes the physical

features, topography, and natural productions of the Vestmanna Islands (Iceland), Jan Mayen, Beeren Island, and part of Spitzbergen, to which six admirable chromo-lithographs from the sketches of Mr. Schiertz, the artist who accompanied the Expedition, also refer. Excellent woodcuts are also given of the Fugleberg, Egg Island, Brielle Tower, the Beerenberg, north coast glaciers, and Hoyberg, in Jan Mayen, with a general winter view of the Island, from the north-west; also of Mount Misery and the Cloven Cliff, Beeren Island.

The map of Jan Mayen, on the scale of 1 : 200,000, accompanying this part, compiled from various sources and corrected by the observations of the Expedition, has (or at least, a copy of it has) appeared already in Petermann's 'Mittheilungen,' xxiv. (1878), pl. 13. The second map, of Advent Bay, Spitzbergen, is from a survey by Captain Wille, with the assistance of a rough triangulation by Professor Mohn and Captain J. Grieg, scale 1 : 50,000.

The description of the isolated volcanic rock Jan Mayen (7·32 geographical square miles in area) is supplemented by a comparison with previous accounts. It is probably of later formation than the Færoes and Iceland, and has a characteristic feature in the fantastic and picturesque rocks of its mostly precipitous coast line, chiefly composed of fragments of lava detached from the streams that have traversed the island, and practically constitute the surface of its low middle tract. Its highest point, the top of the extinct volcano Mount Beerenberg, is 6400 feet, but it exhibits also a number of smaller conical craters. Another special feature is afforded by two lagoons, cut off from the sea by barriers of black sand only a few feet high, and containing fresh water, deep enough on the western side for a good harbour, if the spit were cut through. The large ravines in the more elevated northern part of the island are filled with glaciers, but the southern part appears to be little intersected by valleys, having very few brooks or rivulets. The island has naturally a meagre flora (11 species of plants are recorded), though bright herbage is not wanting; and a green carpet of moss, in some places of considerable extent, contrasts strikingly with the dark rocks. The Polar fox is by no means rare, and seven species of sea birds were observed.

In the account of Beeren Island, some interesting observations occur, bearing on its gradual demolition by ceaseless surf action; the bank extending to it from East Spitzbergen is considered to be probably the remains of a former condition of this land, along with solid matter deposited on the melting of drift-ice.

Nos. I. (1880) and IX. (1882) refer to Chemistry [Chemi]. The first, by Hercules Tornøe, pp. 76, maps and woodcuts, contains the following articles:— 1. Om Luften i Søvandet [On the air in sea-water]; 2. Om Kulsyren i Søvandet [On the carbonic acid in sea-water]; 3. Om Saltholdigheden af Vandet i det Norske Nordhav [On the amount of salt in the water of the Norwegian Sea]. The maps show the proportion of salt in the surface-water and deeper strata, and of nitrogen in the latter.

The second, by Ludvig Schmelck, pp. 71, maps and woodcut, contains:— 1. Om Søvandets Faste Bestanddele [on the solid matter in sea-water]; 2. Om Havbundens Afleiringer [on oceanic deposits]. Grey clay is distributed over the whole sea-bottom examined, from the shallowest coastal tracts to the greatest depths, but at 900 to 1100 fathoms it is covered with a brown sediment (*Biloculina* clay), distinguished by containing certain species of *Foraminifera* not occurring in the more elevated parts of the sea-bottom. The small percentage of carbonate of lime in this, and also of inorganic animal remains, show that the Northern Ocean cannot compare with the southern seas in development of animal life. The layers also appear to contain but a small proportion of mineral substances spread by volcanic eruptions.

The remaining Nos. refer to Zoology, and are as follows:—I. Fiske [Fishes], by Robert Collett, 1880, pp. 164, map, 5 coloured plates; VIII. *Mollusca*, 1 *Buccinidæ*, by Herman Friele, 1882, pp. 38, map, 6 pls.; VII. *Annelida*, by G. Armauer Hansen, 1882, pp. 54, map, 7 pls.; III. *Gephyrea*, by D. C. Danielssen and Johan Koren, 1881, pp. 59, map, 6 pls.; VI. *Holothurioidea*, by the same authors, 1882, pp. 95, map, 13 pls.

Of the parts remaining to be published there would seem from the circular

of the Editorial Committee to remain 12 or 13 purely zoological, and memoirs by Professor Mohn on meteorology, deep-sea temperatures, and motion of the sea. The work when completed will apparently be as perfect in conception and execution as such a Report could be made.

Playfair, [Lieut.-Col.] R. L.—Handbook to the Mediterranean: its Cities, Coasts, and Islands. For the use of general Travellers and Yachtsmen. Second Edition, revised. London (John Murray): 1882, post 8vo., pp. xliv. & 544, maps, plans, &c. Price 20*s.*

This careful revision is some 30 pages longer than the first edition, and parts of it, especially Sicily, Cyprus, and Sardinia, have been entirely re-written on the spot.

Roskoschny, Hermann.—Russland. Land und Leute. Unter Mitwirkung vieler deutschen und slavischen Gelehrten und Schriftsteller herausgegeben von Dr. Hermann Roskoschny. Leipzig (Gretzner & Schramm): 1883, 4to., illustrations. (*Williams & Norgate.*)

The commencement of a profusely illustrated account of Russia and its people, to be issued in Numbers of 16 pages, price 1*s.* each.

Rosny, Léon Prunol de.—Les Populations Danubiennes. La Patrie des Romains d'Orient. Etudes Ethnographiques, Géographiques, Historiques, Economiques et Littéraires. Paris (Maisonneuve): 1882. Text 4to. and Atlas fol., maps, coloured illustrations and engravings from photographs. (*Williams & Norgate.*)

The beginning of a comprehensive work, in which geography is ascribed a prominent position, to be completed in five livraisons of Text and the like number of Atlas of plates, &c. 250 numbered copies only are to be printed, at the subscription price of 150 francs (6*l.* 6*s.*). The geography of central and southern Europe during the quaternary epoch is described (with a map) in the preliminary discussion of ethnogenetic influences; and due importance is given to physical geography as a factor in the distribution of races in historic times. The atlas is mainly of ethnological interest, but the early numbers include a reproduction by heliogravure of a parchment map of Central Europe in the Schéfer collection, dated 1491, and an Orographical and Hydrographical map of Roumania (scale 1 : 2,000,000).

Vallentin, Florian.—Les Alpes Cottiennes et Graies. Géographie Gallo-Romaine. Paris (H. Champion): 1883, 8vo., pp. 113, map. (*Dulau:* price 2*s.* 3*d.*)

The author has made a special study of the French versant of the Cottian and Graian Alps, which offer so many curious subjects for study, especially to the archæologist. He discusses briefly their physical geography (orography, hydrography, climate, soil, flora, products, and fauna), different inhabitants during the historic period, and Roman roads. The latter section is the main part of the work, and contains somewhat elaborate details of the various remains known to exist in the country. The map is supposed to represent the eastern part of Gallia Bracata before the time of Diocletian, and shows positions of Roman colonies, roads, boundaries, &c.

AFRICA.

Macdonald, [Rev.] Duff.—Africana; or the Heart of Heathen Africa. London (Simpkin, Marshall, & Co.), Edinburgh (John Menzies & Co.), Aberdeen (A. Brown & Co.): 1882, 2 vols., 8vo., pp. xvi. & 301, 371 [no Index], illustrations. Price 21*s.*

The author, late of the Church of Scotland Mission, Blantyre, East Central Africa, in his first volume describes native customs and beliefs, mostly from personal experience, giving in the appendix literal translations of native tales. This portion of his work is of interest to ethnologists and missionaries, and contains a mass of information rendering an Index indispensable for future students. The second volume is devoted to missionary life, commencing with

a description of earlier attempts to christianise Central Africa, and a sketch of the Universities' and Scotch Missions, and giving particulars of the journey from Quilimane to Blantyre, with details of the country and natives round that station, incidental topography in the accounts of various short expeditions to Zomba, Lake Chirwa (which is becoming drier every year), &c., and description of the Chiri (Shire) on the road home. Specimens of African folk-lore are given in the appendix to this volume.

GENERAL.

Bridges, F. D.—Journal of a Lady's Travels round the World. London (J. Murray): 1883, crown 8vo., pp. xi. & 413, map, illustrations [no Index]. Price 15*s.*

The authoress recounts her personal experiences during a journey of nearly 2½ years, commencing in Greece in August 1878, and departing from the somewhat monotonous routine of round-the-world tours by a visit to Leh in Tibet, and to British Columbia. Her accounts of Kashmir, Ladakh, and of life in Leh, with extracts from the journal of her fellow-traveller who visited Yarkand in July 1879, leaving her in Tibet to await his return, will be found of especial interest.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

POLAR REGIONS.

Nordpol, Länder um den——, im Auftrag der Internationalen Polar-Kommission. Scale 1:10,000,000 or 133·2 geographical miles to an inch. Justus Perthes, Gotha. Price 4*s.* (*Dulau.*)

EUROPE.

Böhmen, Generalkarte des Königreich——. Von J. E. Wagner. Scale 1:220,000 or 3 geographical miles to an inch. Kytka, Prag. Price 9*s.* (*Dulau.*)

Deutschland, Wandkarte von——. Von A. Petermann. Scale 1:1,000,000 or 13·6 geographical miles to an inch. 9 sheets. Justus Perthes, Gotha. Price 5*s.* (*Dulau.*)

Deutschen Reiches, Karte des——. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1882. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—148. Wittenburg. 179. Lauenburg a. d. Elbe. 183. Malchow. 467. Greiz. & 541. Birkenfeld. Price 1*s.* 6*d.* each. (*Dulau.*)

Deutschen Reichs und seiner Nachbargebiete. Wandkarte von Dr. H. Wagner. 12 sheets. Justus Perthes, Gotha. Price 10*s.* (*Dulau.*)

France.—Carte géologique detaillée d'après la carte topographique de l'état-major. 1:80,000 or 1·1 geographical miles to an inch. Sheets:—61. 'Avranches. 180. Bordeaux. Paris. (*Dulau.*)

Norway.—Topografisk Kart over Kongeriget Norge. Scale 1:100,000 or 1·3 geographical miles to an inch. Udgivet af Norges geografiske Opmaaling. Sheet 15B. Ödemark. 20A. Nannestad. 25B. Gjövik. 46C. Terningen. 47C. Stjördalen. 47D. Meraker. 49B. Skjörn. 49D. Björnör. 50A. Levanger. (*Dulau.*)

——— Den Geologiske Undersøgelse. Scale 1:100,000 or 1·3 geographical miles to an inch. Udgivet af den geographiske Opmaaling. Sheets:—16D. Bergen. 22B. Haus. 47C. Stjördalen. 49B. Skjörn. 50A. Levanger. (*Dulau*).

——— Kristiania Omegn. Scale 1:25,000 or 2·9 inches to a geographical mile. Bl. III. & IV. Udgivet af Norges geografiske Opmaaling. Kristiania, 1881–82. (*Dulau.*)

Norway.—Kart over Romsdals Amt, udgivet af Norges geografiske Opmaaling. Kristiania, 1882. Scale 1 : 200,000 or 2·7 geographical miles to an inch. (*Dulau.*)

——— Reisekart over det nordige Norge. Kristiania. Scale 1 : 80,800 or 1·1 geographical miles to an inch. 4 sheets. (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie, Specialkarte der——. Scale 1 : 75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut, Wien, 1882. Sheets:—Zone 3, Col. XI. Bhm Leipa und Dauba. Zone 5, Col. VIII. Karlsbad und Luditz. Zone 6, Col. VIII. Tepl and Tuschkau. Zone 6, Col. X. Beraun und Hořowitz. Zone 7, Col. XI. Selčan und Jung-Woschitz. Zone 9. Col. VIII. Eisenstein und Viechtach. Zone 9. Col. IX. Schüttenhofen und Winterberg. Zone 10, Col. X. Kruman und Wallern. Zone 18, Col. XIV. Gleichenberg. Zone 23, Col. XII. Gottschee und Tschernembl. Zone 23, Col. XVIII. Orahovica und Beničance. Zone 23, Col. XIX. Esseg, Dárda und Valpovo. Zone 24, Col. IX. Cittanuova und Montona. Zone 24, Col. X. Pinguente und Volosca. Zone 24, Col. XIV. Petrinja und Topusko. Zone 25, Col. IX. Parenzo und Rovigno. Zone 26, Col. IX. Fasana. Price of each sheet 1*s.* 4*d.* (*Dulau.*)

Preuss-Staates.—Messtischblätter des Preuss-Staates. Scale 1 : 25,000 or 2·9 inches to a geographical mile. Königl. Preuss. Landes-Aufnahme. Herausgegeben 1882. Sheets : 361, Kiel, and 3552, Metz. Price of each sheet, 1*s.* 3*d.* Also Index to map on 4 sheets. Price 1*s.* (*Dulau.*)

ASIA.

Ceylon, Map of the Island of——. Scale 1 : 506,880 or 6·9 geographical miles to an inch. Surveyor-General's Office, Colombo, 1881. Lithographed at the Intelligence Branch, War Office, London, 1882.

AFRICA.

Toumat, Yabous & Yal, Les Sources du——. 1881–82. A S.E. Stone Pacha l'Auteur reconnaissant Juan-Maria Schuver. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Société Khédiviale de Géographie du Caire. Bulletin No. 3, 2^{me} Ser.

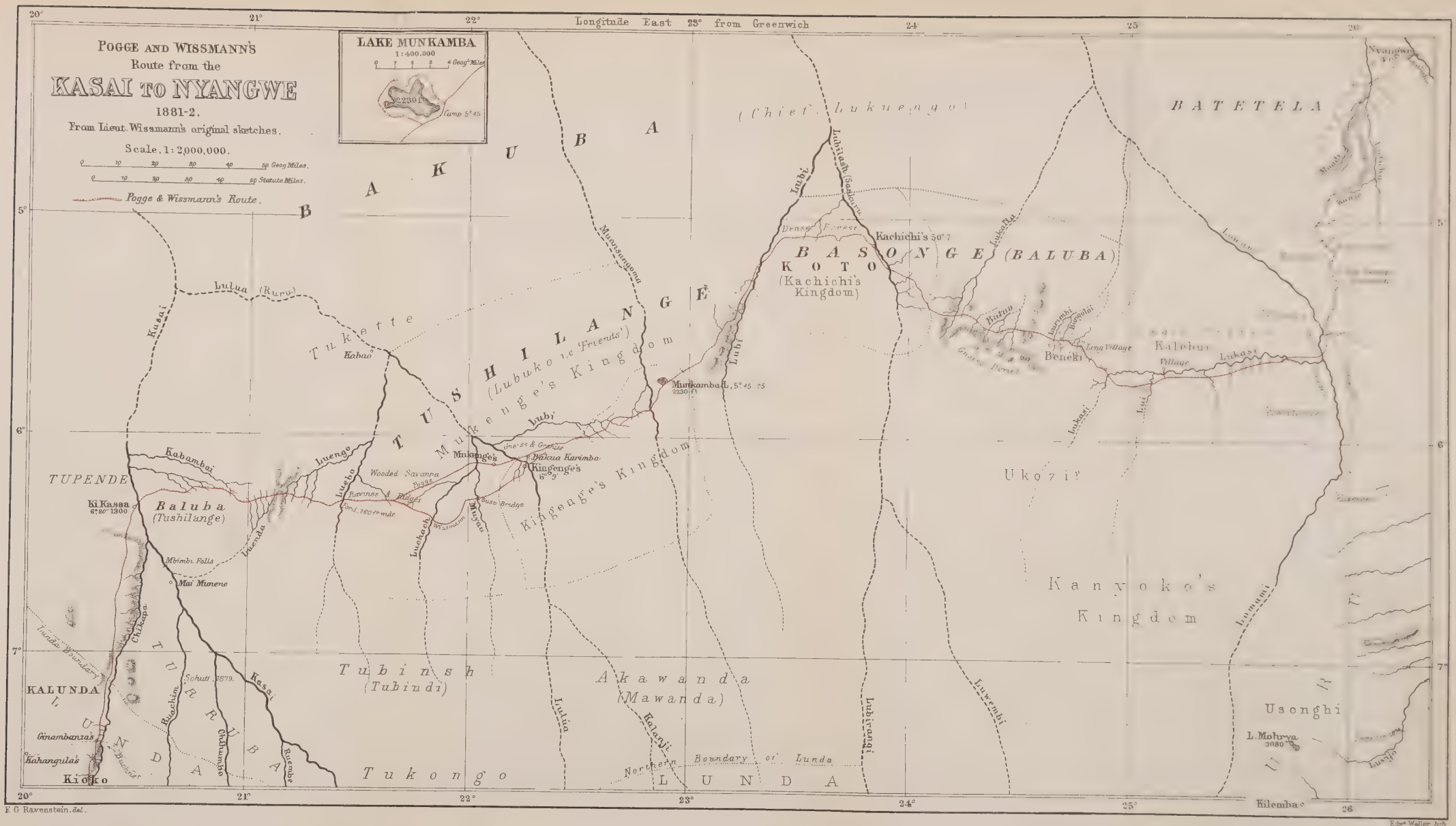
Wala-Fluss, Aufgenommen von Dr. R. Boehm und P. Reichard, 10–23 März 1882. Nach Reichard's Originalzeichnung in 1 : 20,000 reducirt auf 1 : 100,000 or 1·3 geographical miles to an inch. Red. von Richd. Kiepert. Mittheil. der Afrikanischen Gesellschaft in Deutschland. Bd. III. Taf. 10. Berlin, 1883. (*Dulau*).

AMERICA.

Colombia, F. von Schenck's Reisen in——. Blatt 1 : Route Nare nach Medellin und Higueron 1878 & 1880. Reduktion der Originalkarte des Reisenden im Massstabe von 1 : 280,000 auf den Massstab 1 : 450,000 or 6·2 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 3. Justus Perthes, Gotha. (*Dulau.*)

CHARTS.

United States Charts.—Nos. 893, 894, 895, 896, and 897. South America. The Madeira River from its mouth to the Falls of San Antonio. Price 1*s.* 8*d.* each sheet. No. 424. Newfoundland—East Coast. Hare Bay. How Harbor (Outarde or Bustard Bay). Price 7½*d.* No. 922. West Indies. Haïti or St. Domingo. Gonaïves Bay. Price 10*d.* Published 1882 at the Hydrographic Office, Washington, D.C.



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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Explorations in Guatemala, and Examination of the newly-discovered Indian Ruins of Quiriguá, Tikal, and the Usumacinta.

By A. P. Maudslay.

(Read at the Evening Meeting, December 11th, 1882.)

Map and Plans, p. 248.

I think it fair to preface the following description of some of the deserted and ruined towns of Central America by stating that the principal object of my first journey was not geographical or antiquarian research, but a desire to pass the winter in a warm climate. I had made no previous study of American archæology, but my interest had been aroused by reading Stephens's account of his travels, and I started for Guatemala in the winter of 1880–1, in the hope that I might reach some of the ruins so admirably described by him. My success in this first trip was so much greater than I anticipated, that I returned to pass another winter in the country, provided with a larger photographic camera, and generally better equipped for the work.

Ruins near Quiriguá.—I arrived at Livingstone, the Atlantic port of Guatemala, early in January 1881. Ascending the river and crossing the Golfo Dulce to Yzabal, I hired mules, and rode a distance of about 15 miles over the Mico Mountains to a small cattle ranche near the village of Quiriguá, and after a day's rest started, accompanied by some villagers, to visit the ruins, partially examined by Catherwood, which lie hidden in the forest near the banks of the Motagua river.

Leaving the ranche, which stands amongst pine-woods 600 feet above the sea, an hour's ride brought us down to the level land through which the river Motagua here flows. The track soon ended in some native plantations, and we then followed a new track, which the alcalde of the village had sent men ahead to cut for me, and in another hour we came to the ruins. At first I could see no more than the three monoliths in the situations marked A, B, and C on the plan (plan *Quiriguá*, on map, p. 248), round which the underwood had been cleared for a few

yards; for overhead and all round was a dense tropical forest. The stones themselves were so thickly coated with moss and creepers, that it was with difficulty that I could make out any of the ornament with which I afterwards found them to be covered, and I had little hope that I should be repaid the trouble of cleaning them. However, we pulled off the creepers and then scrubbed away the moss with some rough brushes we made out of the midribs of the palm leaflets, and, as the sculpture began to show up, I sacrificed one of my hair-brushes to clear out the more delicate carving of the hieroglyphics.

On this first visit I was able to stay three days in the forest; and during that time I saw five monoliths in position and one fallen, and two of the curious carved stone animals which I will presently describe. But I was not altogether satisfied with my search, as I felt sure that there must be other monuments unknown to the villagers hidden away in the thick undergrowth, so on my return to Guatemala this year I sent some men on a week ahead of me to fell the timber, and then I was able to spend five days myself at the ruins. During these five days we succeeded in finding and cleaning the rest of the monuments marked on the plan.

As this plan shows, these ruins consist of a small number of raised mounds and terraces, usually faced with stone, and near to these terraces a number of elaborately carved monoliths. These latter monuments are of two kinds: high upright stones, ornamented with carvings of human figures and tables of hieroglyphics; and low broad stones, carved into the shape of some animal. The upright monoliths are all of the same general character. Roughly speaking, they measure from three to five feet across the front and sides, and stand from 12 feet to 25 feet out of the ground. On both back and front the principal ornament is a human figure.

At the back of two of these monuments the face is in profile, but in all the others the figures stand full-face, and generally in a very stiff attitude. The heads are sculptured in high relief, and are usually surmounted by curious grotesque masks, from which spring elaborately carved feather head-dresses. The ears are very large, bent forward, and pierced for large ear ornaments. The body and dress are carved in lower relief, and are covered with the most intricate and elaborate ornament, in which small human faces and grotesques frequently occur. In some figures, one hand is holding a sceptre, but more commonly both hands are raised, grasping the neck of the dress. The feet are always turned outwards in a straight line, and are shod with highly ornamented sandals, the back of each sandal shaped into a grotesque human face; so that from the position of the feet, heel to heel, these faces seem always to be scowling at one another.

There is a general similarity in the fashion of the dress, although endless variety in the detail of the ornament; but there is one ornament

which is, I think, hardly ever absent, and that is a small human face or mask placed over the chest; and the custom of wearing this ornament may account for the number of stone masks found in every museum of Central American antiquities, and possibly for those beautiful turquoise and obsidian masks in the Christy collection.

The stone at E on the plan is the best preserved of these monuments, and surpasses the others both in the beauty of its proportions and the particularly graceful arrangement of the feather-work of the head-dress. The largest stone, which is marked F, stands 25 feet out of the ground and leans over at such an angle that one fears it will fall. The upper surface being exposed to the drip from the trees, is nearly worn away, but the under surface is in good condition, and the large head surmounted by a sort of triple papal crown is in perfect preservation.

But undoubtedly the most curious monuments are the large stones carved into the shape of animals. Two of these monuments I am unable to describe, as they were not only more than half buried in the ground, but each one had a large forest tree growing on the top of it. The other three stand above ground, and are still in a good state of preservation. The stone at D is 12 feet 10 inches long, and that at G is longer and narrower. I could not make out what animals they are intended to represent, but both of them have curved claws and indications of armour like an armadillo. Each one has a human head, apparently the head of a woman, between its jaws.

The monument marked R is by far the largest and most interesting of these animals. From a rough calculation I believe this single block of stone to weigh about 18 tons. It is symmetrical in shape, the pattern carved on either side differing only in details. In this case the animal represented is a turtle, but the resemblance is not very easily made out, and in fact, before the earth which hid the lower part was cleared away, I walked round it time after time, and could not think what to make of it. In place of a turtle's head is a huge grotesque human head, with the same out-turned ears and large ear-ornaments common to the other figures I have described. The forearm and flipper can be easily made out on the left side, but on the right side the flipper is not quite so clear; the two hind flippers are turned up at the back of the animal, and in place of the tail is the life-sized figure of a woman sitting cross-legged and holding a mannikin sceptre in her hand. This sceptre occurs in several other monuments, and is more like the children's toy of a monkey on a stick, which one sees sold in the streets, than anything else I can think of. The whole surface of this block of stone is covered with a profusion of ornament which it is quite impossible for me to describe, but which is fairly well shown in the photographs I have taken; and well worth attention are the inverted human masks or faces which are very clearly cut on both sides of the stone.

I do not think there can be much doubt that there are still other

monuments completely buried beneath the ground. The monument at L on the plan, which is standing upright, and would be probably 18 feet high, has evidently been earthed up half its height, and shows how, in the wet season, the frequent floods from the river Motagua, which flows about three-quarters of a mile to the south of the ruins, have filled up the original inequalities of the ground.

On the sides of all the monuments are well-carved tables of hieroglyphics, and other groups of similar inscriptions also form part of the general ornament. In addition to these, which I suppose I may safely call hieroglyphics, there are certain carved tablets of a very curious character, which are also arranged in squares, each square generally containing two or more involved figures. These are usually human figures, but they often have heads and claws of animals or birds, and the limbs so twisted that it is difficult to make out to which heads the legs and arms belong. These squares were best seen in the upper part of the monument at C. They certainly do not give one the idea of writing, but their arrangement and position are such that they can hardly be merely capricious ornament, and I think they must have some symbolic meaning. Possibly they bear the same relation to the hieroglyphics that the curious grotesque pictures bear to the hieroglyphics in the Mexican manuscripts.

Nowhere in the neighbourhood of these monuments could I find any trace of houses. At first I thought that the truncated pyramids and raised terraces marked on the plan might have been the foundations of dwellings or temples, but I could find no trace of such buildings, and houses built on these raised terraces would have afforded but little accommodation. It seems most probable that if Indians dwelt near these monuments they built houses of perishable materials. At the present time there are no Indians at all living in this part of the country. The small village of Quiriguá is inhabited by half-castes —Ladinos, as they are called in Guatemala—and with the exception of some half-dozen Ladino families living on the river banks, the rich valley of the Motagua is uninhabited between Quiriguá and the sea.

I do not know how soon after the conquest mention is first made of these monuments, or indeed, if the early Spanish conquerors ever heard of them at all; but I think it can be shown that Hernan Cortéz must have passed within twenty miles of them (and probably it was much nearer), without knowing of their existence. I came to this conclusion in my endeavour to fix the site of Chacujal, a town of which Cortéz gives a particularly clear description. In his fifth letter to the Emperor Charles V., he describes his marvellous march from the city of Mexico by Tabasco and Peten, and across the Rio Dulce to Honduras; and he relates that when he arrived at San Gil, on the Rio Dulce, he and his followers were so near starvation that he made an expedition up the river and along the borders of the

lake in search of provisions. Not finding sufficient provisions in the small villages on the lake shores, he marched inland, and the furthest point reached in this expedition was the town of Chacujal, where he stayed eighteen days, and from which he had an exciting and dangerous passage back to the lake down the Rio Polochic, which river he calls by the name it still bears. The Indians had already fled from the town when Cortéz arrived at Chacujal, and he thus describes his entrance. "Marching through the place we arrived at the great square where they had their mosques and the buildings round them just in the manner and form of those at Culúa; we were more overawed and astonished than we had been hitherto, since nowhere since we left Aculan had we seen such signs of policy and power. I entered with my men into one of those spacious halls which they generally have near the temples of their idols. We passed the night on watch, and on the following morning sent out several parties of men to explore the village, which was well designed, the houses well built and close to each other."

Being anxious to identify this town of Chacujal, I sent off one of my men with instructions to make inquiries among the woodcutters and salsaparilla hunters at Panzos, and to search for the ruins on the banks of the Cahabon river; for I thought that Cortéz had landed on the north shore of the lake, and marched overland until he had arrived at the Cahabon. My man returned to tell me that no such name as Chacujal was known, that no ruins could be found near the mouth of the Cahabon, but that he had crossed over the Rio Polochic, and that, hidden in the forest on the banks of a stream, still called Rio Pueblo Viejo, he had found the ruined foundations of many houses, but he added that he could find no buildings still standing, nor any stone monuments. This position on the Rio Pueblo Viejo answers so well to that described by Cortéz, that I have no doubt my man saw the ruins of Chacujal, and it then follows, that Cortéz must have landed on the south shore of the lake, somewhere near the present village of Yzabal, not many miles from the monuments I have been describing. From the neighbourhood of Yzabal, Cortéz and his party must then have travelled along the spurs of the Mico Mountains, and, judging from the appearance of the country, it is not to be wondered at that he writes: "We passed over mountains so rugged and steep that we had to make use of our hands and feet in climbing."

Copan.—Leaving the Mico, I crossed the Motagua, and travelled over the hot arid plain of Zacapa to Chiquimula, and thence crossed the pine-clad hills to Copan.

The ruins of Copan have been so admirably described and figured by Stephens and Catherwood, in their charming book on Central America, that I shall say but little about them. There are a number of monuments somewhat similar to those at Quiriguá which I have just described, and there is a decided likeness in the dress and ornaments of

the figures, and in the character of the hieroglyphics, but there is this difference in treatment; that whereas in Quiriguá the human figures form part of the ornament of gracefully shaped obelisks, at Copan the figures themselves are carved in such high relief, that they almost become statues, to which the deeply-cut scroll-work and hieroglyphics are accessories, and both design and workmanship show a more advanced state of art, and probably a later date. Another difference is the total absence of the symbolical or picture-writing (as distinguished from the hieroglyphics) which I noted at Quiriguá.

I saw one monolith, not mentioned by Stephens, which had been brought to light by a villager when clearing away the scrub for his maize plantation. It is curious in its complete difference from the others. It stands about 14 feet out of the ground, and is covered all over with hieroglyphics cut in low relief. On the front of the stone, the hieroglyphics are arranged diagonally in diamond-shapes instead of squares, an arrangement I never noticed elsewhere.

The monument which Stephens calls the buried idol, is now broken in half and the upper part fallen on its face. Whilst clearing away some of the scrub, I, by chance, hit upon a circular altar, buried a foot or more in the ground, which must formerly have stood in front of this idol. The altar is in shape like a millstone, and measures four feet across; it has grooves cut on the top, and hieroglyphics carved on the sides. This is the shape of most of the altars I found in the ruins I subsequently visited.

Journey to Northern Guatemala.—From Copan I rode through the pine woods and oak forests of the Cordillera to the city of Guatemala, and then on to the picturesque but half abandoned city of Antigua, formerly the capital of the country. This latter city was built on a small plain between the slopes of the great volcanoes Agua and Fuego, whose peaks seem almost to overhang the town; but the situation proved as dangerous as it is beautiful, and Antigua has suffered so much from earthquakes, that it is now little more than a city of ruined convents and churches.

One of the most attractive places on this side of the country is the lake of Atitlan, which lies amongst the mountains 5000 feet above the sea-level. Three volcanoes, two of them still active, rise from the water's edge, and quaint Indian villages are dotted along the rocky shores. With the exception of one village, where there are a few Ladinos, all the dwellers on the borders of the lake are pure Indians; and it was at the village of Atitlan itself, where the population must number about five thousand, that I had my only difficulty with the natives. There the Indians, the women especially, took the strongest dislike to my photographic camera. I had taken one instantaneous picture of the women in the market-place before they observed me, but after that they ran after me and shook their fists,

and used what I am sure must have been the very strongest language whenever I appeared. Then I was waited on in the Cabildo by a deputation of about two hundred men, who apparently wanted to know my business, but as only one of them could speak any Spanish, and he was very drunk, it did not mend matters. This sort of thing went on for two days, and then I received notice to clear out of the town, but luckily I was delivered from my difficulties by the arrival of the Ladino magistrate, who was making the round of his district, and who satisfied the Indians that I was quite harmless.

After wandering about for some weeks in the beautiful climate of the high-lying plains, I passed down the northern slope of the highlands, and then ascended again to the town of Coban in the hills of the Alta Vera Paz.

Coban may be called the limit of civilisation in this direction, and each year I have rested there a week and made preparations for my journeys into the forest. It is not a country where preparations can be made in a hurry, and it was very fortunate for me that my friend Mr. Sarg, the Imperial German consul at Coban, took off my hands all the trouble of engaging Indian workmen and carriers, and it is to his unvarying kindness and assistance that I owe much of the success of my journeys.

To the north of Coban the country is very little known, and all the published maps are inaccurate. Twice have I made the dreary ten days' journey through the almost uninhabited forest which lies between Coban and Sacluc. The track is a very bad one, as during six months of the year a great part of the low country is flooded, and although during the months of March, April, and May it is possible to travel on muleback, all baggage has to be carried on the backs of Indians.

As one journeys northwards the limestone hills get lower and lower, and as the land becomes flatter the mud holes in the track are longer and deeper, until one arrives at the Paso Real, where a ferryman with two canoes is stationed by the Government to carry people across the Rio de la Pasion. On a level savannah 10 miles north of the river stands Sacluc, the newly made capital of the province of Peten, the hottest and dreariest village it has ever been my misfortune to stay in. This village is kept in existence as a headquarters of the mahogany cutters, who form temporary settlements, known as monterias, on the banks of the rivers in the neighbourhood.

About 20 miles across the Savannah, to the north-east of Sacluc, lies the lake of Peten, and the curious little island town of Flores, which Cortéz visited on his march from Mexico, and found covered with temples and stone buildings. Every trace of these buildings has now disappeared and given way to a village of the ordinary Spanish-American type. It was here that Cortéz left a disabled horse, and the natives failing to keep it alive on a diet of flowers and fowls and other

offerings usually made to the gods, had it copied in stone by their most skilful sculptors, and set up in a temple built in its honour. Both temple and horse, I believe, went down into the lake during an earthquake many years ago, but the Indians believe it can still be seen, and were regretting as we were paddling across the lake that it was too rough to look for it.

Tikal.—After stopping at some of the villages on the lake to collect Indian workmen, I set off for El Remate at the eastern end of the lake, having already sent men ahead to clear a track through the forest to Tikal, a ruined town about 20 miles from the shores of the lake, which has, I believe, only once before been visited by a foreigner; that visit being made by Bernouilli, who came across the ruins when on a botanical excursion in the forest. A few years ago some Indian families from the lake tried to form a settlement near the ruins, but they found the place so unhealthy that it had to be abandoned. With the exception of the deserted maize gardens of these Indians, which are now covered with thick scrub, the whole site of the ruins was covered with high forest trees.

During my two visits (in the month of April 1881 and in April 1882), each of which lasted about a week, I had twenty or more Indians at work clearing away the trees and undergrowth so as to enable me to take some photographs and make a rough plan of the town (on map, p. 248). The plan is naturally very imperfect, but I have just been able to indicate the shape and size of the stone houses near to the house in which I took up my quarters, which was evidently the most important part of the city, and to give approximately the position of the five great pyramidal temples which are the peculiar feature of the ruins.

All the houses are built of stone and coated with plaster; and the walls are usually about three feet thick. Owing to the growth of the roots of trees and shrubs, the masonry above the walls and lower cornices has been so much displaced, that it is difficult to judge of the original shape of the upper part of the buildings. Inside the houses the walls are about seven to eight feet high, and the stone roof forms a narrow gable. Nowhere is there any trace of an arch, and the gable roofs and heavy masses of stonework above them never permit of the walls being built more than five or six feet apart, and as a consequence the interiors of the houses have more the appearance of long passages than of rooms. The outer doorways are invariably square-topped, and are supported by lintels made up of three or more squared beams of the hard and durable sapote wood placed side by side. There are also sapote beams placed at intervals of four or five feet across the vault of the roof. These may have been built in as supports, but were possibly used for the same purpose to which we put them, namely to hang hammocks to. Some houses are in a fair state of preservation, but in the greater number the wooden lintels have rotted away, and the buildings can be seen in every stage of decay, and are often merely

overgrown heaps of squared stones. The whole town has been laid out on a rectangular plan, and wherever there are differences of elevation the ground has been terraced, and the slopes faced with carefully-laid squared stones. The houses, too, are often built on raised foundations, stone-faced in the same manner.

The most imposing buildings are the five temples raised on almost pyramidal foundations. These foundations are also faced with stone, but the surfaces of the slopes are not always flat, but arranged in rather curious ridges, which are well shown in one of the photographs I took. In front of the foundation projects the great steep stairway leading up to the door of the temple. And the temple itself is set back, so that the back slope of the foundation is much steeper than the front or sides.

The accompanying sketch (see next page) shows the general shape of these buildings, and the following are the dimensions of the temple marked E on the plan. The base of the foundation measures 184 feet in front, by 168 feet at the sides, and the base of the projecting stairway measures 38 feet across. The height of the front slope (measured on the slope, which is very steep) is 112 feet. The base of the temple measures roughly 41 feet by 28 feet, and the height must be over 50 feet, but I was not able to measure it.

There is a general similarity in the ground-plans of all the four temples which I was able to measure, and the most noticeable features are the enormous thickness of the walls (shown in its most exaggerated form in the temple marked F on the plan), the niches in the sides, and the gradual narrowing of the buildings from front to back. The interior in each case consists of two or three narrow passages running parallel to one another, and opening one into the other by broad doorways. At the entrance of each doorway the ground rises in a step a foot high. These doorways, like those in the houses, are supported by wooden lintels, and many of them are elaborately carved on the under surface.

When Dr. Bernouilli was at Tikal, he noticed these carved beams, and some time afterwards persuaded some of the natives to return to the ruins and cut out the carvings for him. The natives accomplished this by tearing out the beams and working them down with axes until they were light enough to be carried, but with the removal of the beams a good deal of the stonework naturally fell to the ground. These carvings are now lodged in a museum in Switzerland, and one small piece about 18 inches long is in the Christy collection in Victoria Street, Westminster. There are still some carved beams left in position, but they are so much decayed on the surface that no copies of them could be taken. Inside the temples the walls are somewhat higher than they are in the houses, and the gable roofs also are higher and form a sharper angle.

There is no trace of any idol or object of worship in these buildings, but I cannot doubt their being temples such as those so often mentioned

by the conquerors when describing other towns. I climbed up to the top of one of these curious buildings, and gained an extensive view over the surrounding country, which is forest-clad as far as the eye can reach.

In the plaza between the temples marked A and B, are a number of stones like the head-stones of a graveyard. Some of them are carved

PYRAMIDAL TEMPLE, TIKAL.

and have in front the figure of a man in profile, and hieroglyphics on the sides—but the workmanship does not seem to be very good, and all are much weather-worn. On some of them the ornament is moulded in a very hard cement, with which the limestone slab has been covered. There are also in this plaza a number of circular altars like the altar at

Copan. In other parts of the ruins I found similar groups of stones, but nowhere in such numbers as in this plaza, and usually they were without any carved ornament. This may have been because the ornament had been made of cement, and had altogether fallen away leaving nothing but the flat surface of the limestone.

I saw one other carved stone standing in the centre of the courtyard of a small house, and I could just make out the figure of a man in profile with elaborate ornaments and large feather head-dress. The circular altar in front was well carved, but the stone was so soft that it even crumbled away under the brush with which I tried to clean it.

The great discomfort in the exploration of these ruins is the want of water. Every drop we used had to be brought a distance of about a mile and a half, from a small overgrown muddy lagoon not more than 150 yards wide; and this water was so thick and dirty that I never drank any of it without first boiling it, and then passing it through a filter. An Indian seldom drinks cold water when travelling or at work, but will stop almost every hour to make a fire, heat a little water and then drink it warm; yet I could not impress upon my workmen the advantage of boiling the water and letting the mud settle, and as a consequence many of them were attacked by fever, and my visit had to be somewhat shortened. Luckily the fever did not seem to be of a very severe kind, and a few doses of quinine soon pulled them round. One of the few survivors of the Indians from the lake, who had tried to settle near the ruins, assured me that there was no other water but that of the lagoon, and that the nearest stream was a small branch of the Hondo some miles to the northward, and I failed to find a satisfactory explanation of how water was supplied to the large population which must formerly have inhabited the town.

In the plaza I found a small hole in the ground about eighteen inches across, cemented round the rim, and I set some men to work to clear it out, but as only one man could work at a time, and he could only pass up the earth in small baskets-full, I was not able to clear it properly, but enough earth was removed to show me that it led to two circular subterranean chambers, six to eight feet in diameter. The sides of these chambers were not cemented, and it seems probable that they were used for the storage of food; but the same plan may have been used for storing water, and as the floors of the plazas were very probably paved with cement, a considerable quantity of water might have been thus collected during the rainy season.

Usumacinta.—Retracing our steps to Saclue I will describe a trip I took down the Rio de la Pasion in search of another ruined town.

During my stay at Coban in 1881, I had the good fortune to make the acquaintance of Mr. Rockstroh, a German gentleman who is a tutor at the "Instituto Nacional," the chief public school in the city of Guatemala. Mr. Rockstroh had succeeded in persuading the Guatemala

Government to grant him six months' leave of absence to explore the rivers connected with the Usumacinta; and when I first met him at Coban, he had just returned from one of his excursions. Unfortunately we could not arrange our plans so as to travel together, and I went on to Tikal, whilst Mr. Rockstroh returned to his work on the Salinas and Usumacinta.

I again met Mr. Rockstroh in the winter of 1881–2 in the city of Guatemala: we compared notes and he told me of the ruined town which he had seen on the left bank of the Usumacinta. He had had neither the time nor the men at his disposal to survey the ruins, but kindly gave me all the information he could, and his description was sufficiently attractive to confirm my purpose of taking a trip down the river. Through the kindness of the magistrate at Sacluc, and of the manager of the wood-cutters, I was able to get canoes and canoe-men to convey me and some of my Indian workmen down to the ruins.

The ruined town for which I was bound is the lowest point on the Usumacinta ever reached in safety by canoe; and between the ruins and the village of Tenosique, lower down, the river is totally unexplored, but is vaguely reported to consist of a series of impassable rapids running between high cliffs. From Tenosique to the sea it is again navigable. All the mahogany and cedar cut on the upper part of the river is squared and sawn into certain lengths, stamped with a number, date, and mark, and then thrown into the river and left to find its own way to Tenosique, where men are always on the look-out to secure it. And although on my passage down the river I passed many logs left high and dry, I am told that not more than ten per cent. of the wood is thus lost.

Only one attempt, as far as I could learn, has ever been made to navigate these rapids, and that was by two wood-cutters, who, after a very festive evening, boastfully started in a canoe for Tenosique. The canoe arrived in safety, but neither of the men were ever seen again; as I further learnt that they had with them a keg of that awful compound known as native rum, it would be hard to say whether they were killed by the water or the spirit.

At the Paso Real, where I embarked, the Rio de la Pasion is a muddy sluggish stream about 170 yards broad, passing with hardly perceptible current between low wooded banks. About 45 miles * below the Paso Real this river is joined by the Rio Salinas, also a muddy stream, 70 to 80 yards broad, but with a more rapid current. Below its junction with the Rio Salinas the stream becomes swifter, and is broken by occasional rapids, and about 20 miles below the mouth of the Salinas it is joined by a clear, rapid stream, about 70 to 80 yards wide, called the Rio Lacandon. It is on the junction of the Rio de la Pasion with the

* The distances given from point to point on the river are merely guesses made during a hurried passage in a canoe, but I believe that a map of the river as far as the ruins is now being worked out from M. Rockstroh's observations.

Rio Lacandon that the river takes the name of Usumacinta. In the published maps the Salinas and the Lacandon are represented as one and the same river. A small monteria, the lowest down-stream, is just being commenced a few miles below the mouth of the Lacandon.

After flowing rapidly for 8 or 10 miles, the Usumacinta narrows to pass through a range of hills—the channel in some places not being more than 40 feet wide, with steep banks rising on each side. The current here is not very rapid, but the water appears to be of great depth. It is no doubt the block occasioned by this range of hills which causes the tremendous floods of the Rio de la Pasion in the rainy season, when the river rises 40 and 50 feet, and floods the country for miles on either side. For a few miles below the narrows the river widens and narrows at intervals, and the current becomes very rapid, and appears to increase in rapidity the lower one gets down the river. It requires considerable skill to guide the canoes safely between the projecting rocks and snags, and very few of the canoe-men on the river have ever ventured below the Boca del Cerro, as they call the entrance to the narrows. About 25 miles below the Boca is a spot known as the Paso de Yachilan, and another 15 miles below this one sees on the left hand an artificial heap of stones about 14 feet high, built on a low rocky bank which runs out into the river, and this is the only indication that one has arrived at the ruins; for here (as they had been all the way from the Paso Real) the banks are densely covered with forest.

Since passing through the narrows we had seen some of the small canoes of the Lacandon Indians drawn up on the banks of the river, and had met two or three of the Indians themselves. At one point I walked about two miles inland to visit one of their settlements, which I will describe presently.

On the 18th March, the day I arrived at the ruins, the water in the river was so low that the bank on which the pile of stones stands was high and dry, but from the colour and marks on the stones it appears as if the average height of the river were two or three feet below the top of the pile. On the top of a steep bank, some 60 feet above the level of the river, stands the first row of houses, and (what I am afraid the plan but imperfectly shows) the town is built on a succession of terraces to the height of more than 250 feet. Every one of the slopes is either formed into a flight of steps, or faced with well-laid squared stones. Where the plan is drawn with definite outlines, the houses are still in a fair state of preservation, but where the outline is left indefinite the houses are reduced to mere heaps of stones.

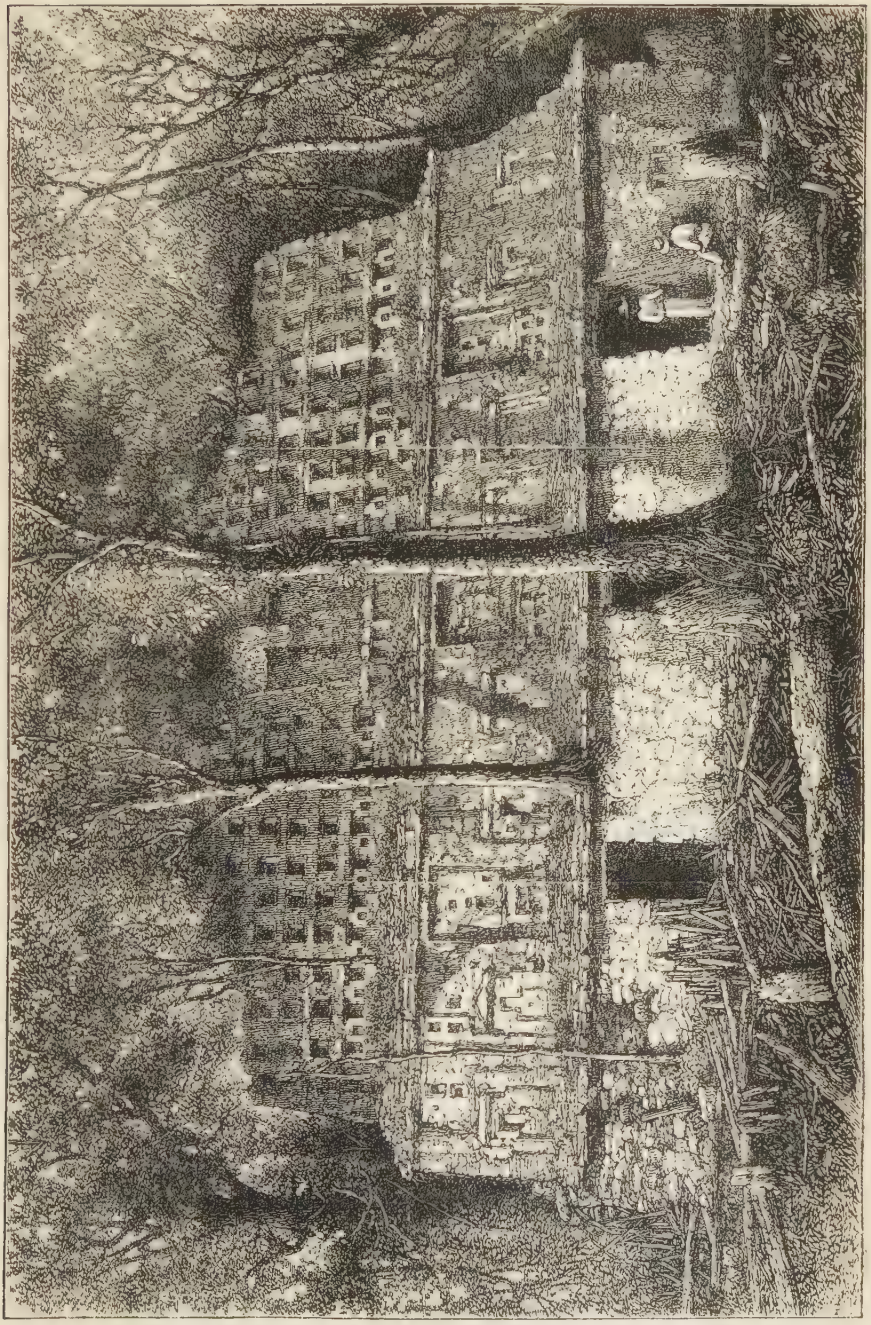
The town is quite a small one, very much smaller than Tikal, but one meets with the same difficulty in making plans in all the ruins, that is, the rich luxuriance of the vegetation, so rich, that as can be seen in some of my photographs, trees of considerable size find footing on cornices only a few inches wide. The houses differ in two

respects from those at Tikal. First, instead of the long narrow interiors usual at Tikal, these houses are broken up into a number of recesses by the building of inside buttresses which, by supporting the roof at intervals, allow the gable to be built at a slightly wider angle, and so gain greater depth in the recesses. The other difference is an important one, namely, the employment of stone instead of wood for lintels. Many of these lintels are carved on the under surface, and I have succeeded in bringing to England one of the best preserved of these carved stones.* I took it from a half-ruined house, where it had fallen from its place, but was luckily resting with the carved side against the wall, and had thus been protected from the weather. The stone, when I first saw it, weighed about half a ton, but by keeping men constantly at work on it with the point of a pickaxe and some chisels which I had luckily brought with me, at the end of a week we had chipped it down to half its original thickness, and cut off the two ends. Afterwards, when it reached Sacluc, we cut it down to its present size with hand-saws.

The house marked D on the plan is the house in which I took up my quarters, and as it is fairly well preserved, and as I was able to take some photographs of it, it will perhaps be the best one for me to attempt to describe. The accompanying engraving is taken from one of my photographs of the building. It stands by itself, about 200 feet above the level of the river, raised on a succession of terraces. As the ground plan shows, it is a long narrow structure 73 feet long by 17 feet broad, with three doorways in front, each with a rather poorly carved stone lintel. There is a projecting cornice about two feet above the height of the doorways, which is about level with the top of the wall inside. Then rises a second course of 11 feet of stonework, covering the gable vault within, and above this there is a hollow superstructure which looks like a pigeon-house with a number of pigeon-holes; the total height of the building being about 42 feet. On the face of the second course are a number of squares which look something like blocked-up windows.

The whole of the house has been covered with stucco and painted in various colours, for traces of the plaster and the colours can still be seen; and these apparently blocked-up windows are the frames for human figures made in plaster, which were also probably coloured. On the second course there must have been three large figures and eight small ones, and above, in the centre of the pigeon-hole course, is another figure more than twice life size. Of these figures but very little now remains; only here and there are portions of a sort of rubble skeleton which supported the plaster. The skeleton of the centre figure can be clearly seen in the photographs, as it still possesses one leg, part of the body, the head, and the prominent stone which supported the nose, but all trace of plaster or colouring has gone. The pigeon-hole course

* Exhibited by Mr. Maudslay to the Meeting.



HOUSE AT TSUMACINTA.

was also covered with elaborate stucco ornament, but very few pieces of it now remain.

As all the houses appear to have been decorated in much the same way, the view from the river in the old days of the white terraces and the bright coloured houses with their rows of sculptured figures, must have been both picturesque and imposing.

Inside the house I have described, in the centre recess, is a great stone idol, twice life size. The figure is fairly well carved, and being represented sitting cross-legged with its hands on its knees, reminded me much of the figures of Buddha. The head, with its grotesque mask helmet and large plumes of feathers, is broken off the body and lies beside it. Over the recess there appears to have been a sort of canopy of ornamental plaster work, probably supported by wood; this has fallen to the ground, but pieces of the ornamental plaster can still be found amongst the rubbish and broken pottery which choke up the recess.

The house at E on the plan (p. 248) has inner rooms, and a passage with steps leading down to a vault at the back. Parts of this vault are roughly blocked up with stones; and the house marked A also has a chamber at the back, partly blocked up in the same manner. I now believe that these blocked-up chambers are burial-places, and much regret that I had not time to open any of them. There are several circular altars in different parts of the ruins, but the carving on them has almost disappeared; and there are three carved stone slabs like those in the plaza at Tikal, but they are fallen, broken, and worn out.

In nearly all the houses I found earthen pots, partly filled with some half-burned resinous substance. Some of these pots, in the same state as I found them, I have brought to England and now exhibit to the Meeting. They were in great numbers round the idol in the house I lived in. Some look much newer than others, and many are in such positions that it was clear that they had been placed there since the partial destruction of the houses. I have little doubt that they have been made and brought by the Lacandon Indians, who still live in an untamed state in small communities on the banks of these rivers; and if my conjecture be correct, it may be that the fact of these Indians still holding in reverence the temples built by their ancestors, and making offerings of incense, has led to the story which for many years has been current in Central America, that there yet exists an inhabited Indian city, hidden away in the forests, and still flourishing as in the days before the conquest. Stephens repeats the story as it was told to him by the laughing padre at Sta. Cruz Quiche, who said that from the top of a high mountain on the road to Chiapas he had himself seen "a large city spread over a great space, with turrets white and glittering in the sun." As the country has become a little better known, the mystic city has been driven further back into the forest, until it had arrived at

the banks of the Usumacinta, and now it must be driven down stream to the impassable rapids.

There are two conclusions which, I think, we may fairly arrive at with regard to these ruins. One is, that the town is of greater antiquity than Tikal; for, notwithstanding the advantage of stone lintels, many of the houses are now mere heaps of stones; and in the single house in which I could find that wooden lintels had been used, not one particle of the wood was remaining. The other is that these stone houses were only used for public purposes, or by a privileged class, as it seems most improbable that the small number of persons which these houses would have accommodated could have performed all the work of terracing, house-building, and decoration. I cannot help further suggesting that the pile of stones on the river-bank, which was possibly then a well-built pyramid, marked a passage, and that this town may have risen into importance as a crossing-place between the Maya cities of the north, and the sacred city of Palenque. What makes this view more probable is, that, as far as we know, for many miles below this point the river forms a succession of impassable rapids.

After we had commenced working at these ruins, as our supplies of food were rather short, I sent some of my canoe-men up the river to buy plantains from the Lacandon Indians. The men returned the next day without many plantains, but with something carefully wrapped up in a piece of paper, which proved, much to my surprise, to be a card from M. Desiré Charnay, the head of the Franco-American scientific exploring expedition, who, for two years, has been at work at the antiquities of Mexico and Yucatan. M. Charnay had come through the forest from Tenosique, a most troublesome journey, and, arriving at Yachilan, without canoes to bring him and his party down the river to the ruins, was just about to set to work to build a canoe when he met my men. The next day I sent up my canoes for him; and M. Charnay, leaving his party camped at Yachilan, came on with his assistant and some canoe-men, kindly bringing me some provisions for my men; and I had the pleasure of his company during the rest of my stay at the ruins. M. Charnay has made a most valuable collection of paper-moulds from carvings and inscriptions in Yucatan and Mexico, casts from which are now exhibited at the Trocadero in Paris. Amongst them is a cast from the lintel of the next doorway in the house from which this stone was taken, and other carvings from these ruins; and I have promised a copy of the stone I have brought to England to add to the collection.

I parted with M. Charnay at Yachilan on my way up the river, and he started on his march back to Tenosique, and thence by river to the Gulf of Mexico. It was hard work paddling the canoes up against the strong current, and the canoe with the heavy stone in it had to be hauled along from the high banks and projecting rocks for a great part

of the way; we were thus six days getting back to the mouth of the Salinas, a distance of not more than 75 miles.

On my way up stream I again went to the settlement of the Lacandones. On my first visit I had only seen two women, as all the men were away hunting for wild cacao in the forest. These women received us very well, and were not in the least frightened; in fact, they seemed more at their ease and better mannered than Indian women in the civilised part of the country. On my second visit the men had returned, and they appeared equally friendly. These people speak the Maya dialect of Yucatan, and I was able to talk to them through one of my canoe-men who knew something of their language. We rested in a detached shed, but on my saying to one of the men that I should like to enter a house, he told me that he was afraid of the dogs biting me; however, he opened the door of his house for me to look in, and I was greeted by yells from half-a-dozen dogs all straining at their ropes to get at me, and there were two or three more held back by the women. In the very hasty glance round I could see nothing different from an ordinary Indian ranche.

In the clearings round the houses were growing maize, tobacco, chilis, tomatoes, and calabash and cotton-trees. The Indians seemed to be well off, and looked healthy. All wear the same sort of garment, made from a material which they weave themselves. It is something like a sack, both in colour and shape, reaching below the knee, and having holes cut for the head and arms; sometimes loose sleeves are added. Each one of them wore several necklaces of brown seeds ornamented with the small bones of an animal, or with a few glass beads and silver coins, but nothing that I could offer them would tempt them to part with a single necklace.

In colour these people were much lighter than any of my Indian workmen. They all had thick lips, prominent nose, and extraordinary receding forehead, nearly as represented in the figures on the carved stones. Their only weapons, as far as I could see, were bows and stone-tipped arrows. A few of these Indians live about the monterias, and become rather the pets of the wood-cutters; yet, although I was always asking questions, I could learn very little about them. They are said to be few in number, scattered about in small communities of two or three families along the river banks. These communities are often at war with one another—the object of the wars being to carry off women.

On my way up stream I heard of some carved stones in the forest just above the mouth of the Salinas, and on landing and scrambling through the thick scrub up the steep bank, I came upon the remains of a town of considerable size, indicated by a number of raised foundations and terraces, but I could find no stone houses. There were several carved circular altars all much weather-worn.

After returning to Sacluc and visiting Tikal, as already narrated, I

set off across the country to British Honduras. The carriage of our heavy sculptured stone was no easy matter. The track is level, but wretchedly bad, and our pace was so slow, that when half-way to the frontier I had to push on ahead in order to catch a steamer at Belize, and to leave it to my half-caste hunters with seventeen Indian carriers to bring it to the frontier village. This they did successfully, and the stone was then sent down the river in a canoe and shipped at the port of Belize.

In conclusion let me say that I have always met with uniform civility from the Guatemala Government officials from the President downwards, and much kindness and assistance from all the foreign residents with whom I have come in contact.

In introducing the author to the Meeting, the Chairman (Sir J. H. Lefroy) said the paper to be read was by Mr. Maudslay, who had had the good fortune to disinter ruins in Central America previously unknown to travellers, and to add greatly to the interest, both scientific and archæological, of ruins already known to exist. The ancient Indian village of Quiriguá, for example, which was one of the places explored by him, had been partly described by Stephens, but Mr. Maudslay's researches added much to our previous knowledge. The ruins of Tikal although previously visited by M. Bernouilli were described for the first time by him. Other travellers had skirted but very few had crossed the great range of the Sierra. Mr. Maudslay had in fact explored a country of which the Royal Geographical Society knew next to nothing. With the exception of Captain Brine's paper, he did not think anything had been read before the Society about that region for fifty years. Lake Peten was surrounded by legends of a very interesting kind. Mr. Maudslay had reached that lake, and thence descended by the river Usumacinta to a ruined city of the same name, hitherto unknown. Only twenty years ago a Capuchin monk, from the Rio de la Passion, asserted that of his own knowledge human sacrifices were offered by the Caribs in the mountains of Central Guatemala; but the area of mystery was, by Mr. Maudslay's travels, driven still further inland. The whole region was one of legend and fable, and the paper would be sure to excite the interest of the Meeting.

After the paper—

Captain Lindesay Brine said that about thirteen or fourteen years ago he crossed the American continent from the Pacific coast near Guatemala to the Atlantic at Sisal in Yucatan, passing by the Lake Atitlan, St. Cruz de Quiché, Ocosingo, and Palenque, and through Yucatan to Uxmal, the route he took being very much the same as that taken by Stephens in 1840. His object was to see the Indian tribes inhabiting that region and the class of monuments to be found there, and to ascertain whether there was any connection between those monuments and the Egyptian temples, or the ancient Buddhist temples in Upper Burmah. He spent four months on the journey, and he had come to the conclusion that there was no traceable link between the temples in Burmah which he had visited and those in Central America. There was also nothing to connect the Egyptian hieroglyphics with those found on the monoliths in that country. The Indians there still spoke the language of the Indians of the time of Cortez. The pyramidal monuments alluded to by Mr. Maudslay with steep steps leading to the top were sacrificial altars. The larger groups of stone buildings were temples in which the priests and chiefs lived, the lower classes no doubt living in smaller houses and huts, now all destroyed. He considered that what was existing there at the time of the conquest by the Spaniards was not of very great antiquity. The preservation of the Zapote wood beams and

lintels showed that it was not necessary to consider the temples to be older than about three centuries before the arrival of the Spaniards. At that time the Indians were rising towards a decided condition of progress, and it was to be regretted that they had not had a fair chance of developing the highest attainable state of Indian civilisation.

The CHAIRMAN said it was a singularity almost unexampled in history, that a race whose "power and policy" aroused the wonder of Cortez three or four centuries ago, had now passed away, and their descendants had reverted to what was known as the stone age. Captain Brine, in the paper which he read before the Society, mentioned their actual use at this time of stone weapons, and Mr. Maudslay and Mr. Hartley had noticed the same thing. He was inclined to consider the antiquity of the ruins perhaps greater than Captain Brine seemed to think, but they are by no means all of the same age. He wished to express his gratification that an Englishman had entered the lists with the various scientific foreigners who were exploring this region. The country was not 100 miles from a British frontier, and it would be very hard if harvests were reaped there by Frenchmen and Germans instead of by Englishmen, through the apathy of the British or the Colonial Government. There was an unread chapter of history in the ruins. Probably the characters to be seen on the lintel before the Meeting, were not alphabetical, but simply a *memoria technica*, intelligible only to those who already knew what was recorded, and if so there could be but faint hopes of recovering the key. Great efforts were, however, being made, though not in England, to interpret them. In conclusion he proposed a vote of thanks to Mr. Maudslay for his interesting paper.

*Second Voyage of the 'Eira' to Franz-Josef Land.**

(Read at the Evening Meeting, February 12th, 1883.)

Map, p. 248.

THE *Eira* left Peterhead on the 14th of June, 1881, with a company of twenty-five explorers, officers and men, the objects of the voyage being geographical exploration and discovery. The intention was to extend and complete the knowledge which was acquired of the coasts of Franz-Josef Land during the previous season of 1880.

On June 22nd the ice was met with in 72° 45′ N. and longitude 17° 20′ E., and the edge was followed until the 30th, when Novaya Zemlya was sighted in 73° 1′ N. As no opening was found in the ice an attempt was made to enter the Kara Sea, which failed. This occupied the time until the middle of July.

On July 13th an opening was found in the ice in 73° 53′ N. and longitude 46° 8′ E.; and the *Eira* steamed northward through large water-holes, the ice being, for the most part, very much decayed. But as they advanced northwards it became much closer and thicker, and many large floes were passed. One was at least 15 miles long, and it took three hours to pass it. Several necks of ice had to be charged and

* Drawn up from Mr. Leigh Smith's journals by C. R. Markham, C.B., F.R.S., Secretary R.G.S.

broken through, and twice the *Eira* was caught between large floes; but she received no damage. During this time, and afterwards, cotton-gunpowder was found very useful in blasting the ice.

After ten days of ice navigation the goal was reached. Franz-Josef Land was sighted on the 23rd of July, the *Eira* steaming towards Cape Ludlow. This is the opening which was found to be impenetrable in the previous season. Now, however, although there was a close pack to the north, a lane of open water extended W.S.W., and the *Eira* reached a point further west than had been possible in 1880. Thus the land was seen connecting Cape Ludlow with Cape Lofley, the latter being the extreme point of land hitherto discovered.

On the 24th it was foggy, and the drifting floes were very thick, some of them so hummocky that not a level space could be seen. As the thick weather continued, and there appeared to be little chance of penetrating further north, the *Eira* began to steam inshore, and passing between icebergs and overhanging glaciers the explorers entered Gray Bay where it was quite calm and the sun was shining brightly. Many walrus were basking on patches of ice, and seventeen were shot. Near the ship was an old seabeach, 90 feet above the level of the sea, and cliffs of columnar basalt about 800 feet high. Many flowers were in bloom, among them a *Potentilla* which had not been found before on Franz-Josef Land. Innumerable birds were breeding on the surrounding cliffs. A heavy gale was blowing outside, and on the 28th there was more rain than Mr. Leigh Smith had ever seen before in the Arctic regions.

After a stay of five days in Gray Bay, he steamed out to Cape Crowther, where thirty-five walrus were killed; but as it was thick weather and much ice was drifting shorewards, the *Eira* was brought back to her safe refuge, and remained there until August 2nd. On that day David Island was visited, and much fossil wood was found there. The course of the *Eira* was then directed towards Bell Island, but the entrance of Eira Harbour was closed with fast ice. Some icebergs, coming down Nightingale Sound, had ploughed their way through the land-floe and left lanes of water behind them, up which the *Eira* steamed. The ice was quite level as far as the eye could reach, but the lanes soon ended, and on August 6th the explorers returned to Bell Island. The next few days were occupied in building a store-house on Bell Island, the materials for which had been brought out for the purpose. The house was christened *Eira Lodge*, and in its honour a dinner was given on board the steamer, followed by a concert and ball in the lodge.

On August 15th the *Eira* steamed through Bates Channel into Gunther Bay, and on the next day, after landing at Cape Flora, Mr. Leigh Smith proceeded towards Barents Hook. He intended to go eastward, and search for the *Jeannette*, but the pack ice was close down upon the land-

floe, and no progress could be made. The weather was, however, very fine and calm, and some days were spent near Cape Flora, dredging and collecting fossils and plants.

On Sunday morning, the 21st of August, the sun was shining brightly and it was nearly calm. There was nothing to warn the explorers of the approach of a disaster that was so near at hand. The pack ice came in with the tide, and the *Eira* was caught between it and the land-floe. She was protected by a grounded berg, and for some time no serious injury was done to her, although she received several severe nips. But suddenly, when the worst seemed to be over, the berg gave way. Shortly afterwards the *Eira* heeled over to port, away from the land-floe, and it is supposed that a tongue of ice went through her side, near the fore rigging. The pumps were powerless to keep down the water. So all hands were employed in passing provisions out of the forecastle, hold, and the cabin, on to the ice, and in saving everything that could be got at.

As the good ship went down the ice caught her jib-boom and broke it short off. Then the lower yards held her for a few seconds and righted her. But they soon broke in the slings with a loud crash, the yardarms turning upwards as she settled down, first the lower yards, then the topsail and top-gallant yards. "She's awa'," the men exclaimed sorrowfully; "she was our home; she was a bonny ship." When she reached the bottom in 11 fathoms, the main and fore topmasts were still above water. Looking down from the ice they could see her quite distinctly, and did not perceive any injury done to the hull.

A tent was rigged up on the ice, made of spars and sails rescued from the ship, a fire was lighted and tea was made. Then after a good supper, no one having eaten anything since breakfast, all turned in except the watch. Early next morning they began to take the stores that had been saved to Cape Flora in the boats, and when everything had been landed a tent was pitched on an old seabeach covered with turf and flowers, about 20 feet above the level of the sea. Some spars and planking floated up from the ship, and were secured during the 23rd; and on the same day two bears and many looms were shot.

The destruction of the *Eira* was a very serious loss. So admirably adapted a vessel was sure to have done more useful work in the coming years. During August 1880 she had been the means of enabling Mr. Leigh Smith and his party to examine the southern coast of Franz-Josef Land and its off-lying islands, and to observe the physical aspects of the region, as well as to make valuable collections. In 1881 similar work had been done, while the *Eira* had demonstrated the comparative facility with which Franz-Josef Land can usually be reached. So that she was a serviceable ship and, in her brief career, she had rendered really good service to geographical science.

The stout-hearted Britons who found themselves thus left shelterless

on those icy shores to face the rigours of an Arctic winter, and with only a small heap of stores around them, set to work at once to make the best of their perilous situation. They at first intended to make for the store-house erected a few days before at Bell Island. But there was so much ice in the channel, that it was impossible to get across, so they prepared to winter on Cape Flora. On August 26th they began to build a hut of turf and stones; the cold in the tent was so intense, that the men could not sleep; the wind blew it down, and the rain came through, wetting everything.

During the rest of August the shipwrecked explorers were building the hut, and busily employed collecting driftwood and shooting looms, walrus, and bears. Their very existence depended on their success in obtaining fresh animal food, and it was most providential that, in this part of the Arctic regions, it was possible to live on the resources of the country throughout the winter. Eira Harbour was visited on September 1st, the boat crossing Gunther Channel to the store-house at Bell Island, a distance of 12 miles. Poles for roofing the hut, some salt, and six bags of coals were brought back. During the autumn 21 walrus, 13 bears, and about 1200 looms were shot. By the end of October the birds had all departed. Besides the twenty-five human beings, three other shipmates on board the *Eira* landed at Cape Flora. One was the black retriever "Bob," a most useful companion, who often found bears and walrus, and gave timely warning to his human friends. On October 28th he discovered some walrus on the edge of the ice, at a distance of 300 yards from the hut, and brought all the sportsmen down with their rifles. The result was that five were killed, but some got into the water, sank to the bottom, and had to be got up with harpoons fastened to long poles. Bob also gave frequent warnings of the vicinity of bears. The other shipmates were a kitten and a poor little canary bird which survived until New Year's Eve.

The provisions landed from the ship consisted of 1500 lbs. of flour, 400 lbs. of bread, a barrel of salt meat, 1000 lbs. of preserved meat and 800 of soups, tobacco enough to give each man 2 oz. a week, 60 gallons of rum, a few cases of brandy and whisky, some sherry, 6 dozen of champagne, plenty of preserved vegetables, and some small stores. There were also 1 cwt. of coals and some wood saved from the ship and 6 bags of coal (cwt. each) brought over from the store-house at Bell Island. But all the coal was used by January 8th, and from that time the only fuel was blubber. The preserved meats and soups were kept for the boat voyage, and were not used during the winter. They had no lime-juice. Each man received $1\frac{2}{3}$ lb. of fresh meat, $\frac{2}{3}$ of a lb. of preserved vegetables, $\frac{1}{4}$ lb. of flour, tea, and rum every day. More meat was used when the stock was large. Altogether the daily consumption was 35 lbs. of meat and 10 lbs. of vegetables.

The routine during the winter was as follows:—Breakfast for all

hands consisted of about 10 lbs. of bear and walrus meat cut up small and made into soup with some vegetables, which was boiled for about four hours. Each man also had about a pint of tea, with sugar and milk. This meal was served at 8 A.M. Dinner was at 12.30, when about 15 lbs. of bear and walrus were boiled up with vegetables and made into scouce or soup; and each man also had a dough-boy made with $\frac{1}{4}$ lb. of flour, and boiled in the soup. Five o'clock tea consisted of 10 lbs. of meat made into soup with vegetables, and a pint of tea. A glass of rum was served out at 6 P.M. On Saturdays there was a larger allowance of rum. The ship's cook, named Masson, a hard-working, cheerful fellow, did all the cooking except the dough-boys, which were made by Captain Lofley while the flour lasted. It came to an end on April 30th. The cook was at work from 6 A.M. to 6 P.M., and often it was very trying and disagreeable work; while his mate, a lad of sixteen, cut up the blubber and wood, and helped in other ways. Dr. Neale undertook the duty of weighing the provisions, and serving out the meals in twenty-five cans made out of old provision tins. These were handed to the men, who sat up in bed and ate their food like so many blackbirds in a nest. On Sunday morning, at 9.30, the ship's bell rang for prayers, and Dr. Neale performed divine service. There were festivities, consisting of a grand dinner followed by a concert, on Christmas Eve and New Year's Eve.

During the winter the men employed themselves in making and mending clothes and boots, and in darning and hitching stockings. Some books and several musical instruments had been saved, and the men amused themselves by reading, playing, and singing. They also had several packs of cards, and often played eucre and other games.

There was not much total darkness; even on the 21st December there was about four hours' twilight. The moon was only away ten days each month, when she would have been of little use, and remained always above the horizon for some days before and after full moon. The auroras were not very frequent or brilliant; they resembled thin gossamer clouds lighted by the moon.

The most important work during the winter was the capture of bears and walrus, and in this the retriever "Bob" was a most efficient auxiliary. On the 14th of January his zeal led to his receiving a hug from a bear before it died; on the 24th he found five sea-horses on the ice, gave notice, and three were secured. On the 25th he enticed a bear to follow him up to the hut, when it was killed. Thus, by diligent watchfulness, and by being always on the alert, and aided greatly by the sagacity of "Bob," sufficient fresh meat was obtained to last throughout the winter. The health of the men was in this way preserved during all this trying time, and, although they had no lime-juice, there was no sign of scurvy. The immunity from sickness, and especially from the dreadful disease which so often disables the Arctic explorer, was

due to the abundance of fresh meat. Nothing could have been more confined than the accommodation afforded by the hut; it was often difficult to take regular exercise. The predisposing causes were there, but the abundant supply of fresh animal food sufficed as a perfect antidote.*

In May the men were busy making sails for the boats, and preparing for the attempt to escape southwards as soon as the navigation was possible. The weight of the boats made it impracticable to drag them for any distance over the ice. There were no means of undertaking sledging expeditions, but the state of the ice, especially up the fiords and straits, showed that much exploring work might easily have been done by sledges, and that a considerable extent of coast-line could have been examined by travelling parties.

By the 1st of June the open water was about five miles from the land, running east and west, and at least 10 miles wide. The intervening ice was examined, but it was found to be too rough for dragging the boats over. On the 13th there was a gale of wind, which broke the ice up in Gunther Sound, and a crack widened close in shore until it was a mile across, communicating with the open water in the offing. On the 14th a boat was sent over to Eira Lodge, returning with salt, sledge cooking-apparatus, and four walrus. Some days were employed in cooking and tinning up the walrus for the boat journey. Finally, on the 21st of June, they set out on their perilous boat voyage, in the hope of reaching Novaya Zemlya, and of there being picked up by some vessel.

There have now been two winters passed on the coast of Franz-Josef Land. The *Tegetthoff*, in 1873–4, off Wilczek Island, was in 79° 43′ N.; Mr. Leigh Smith, in 1881–2, was 100 miles farther west, and 13 miles more to the north on Cape Flora, in 79° 56′ N. Both these winter-quarters had a southerly aspect. Nordenskiöld, in 1872–3, wintered at Mossel Bay, on the north coast of Spitzbergen, in 79° 54′ N., in nearly the same latitude as the winter-quarters of Leigh Smith, but with a northerly aspect. At these three stations the winters were very much less severe than on the same parallel in Smith Sound, owing apparently to the expanse of ocean, where the ice is in motion, more or less, throughout the coldest months. In December there was a very remarkable rise of temperature at Cape Flora, accompanying a southerly wind and very heavy falls of snow. The thermometer rose as high as + 31°, and the mean of the month was + 4°. A similar phenomenon occurred at the *Alert's* winter-quarters in 1875, during the coldest winter that has ever been observed, and at the most northern station ever reached. On

* The blood of the animals killed was kept in a frozen state, to prevent any chemical change. The daily allowance was cut out and thawed over the fire. We had about two hundred six-pound tins of potatoes which had been peeled, parboiled, and then tinned up whole. The temperature in the hut was so low that all the moisture was frozen out of the air and deposited in the form of snow or ice on the walls and roof.—[B. Leigh Smith.]

December 2nd, during a south-easterly wind, the thermometer rose to + 35°, and it was afterwards ascertained that a remarkable rise in temperature was experienced, at the same time, on the west coast of Greenland, the disturbance arriving at the northern stations twenty-four hours afterwards. The heat excess above the normal temperature was as much as 58°. In the case of Cape Flora, this rise was probably caused by the southerly winds coming direct from the expanses of open sea to the south. Its effects on the conditions of animal life in Franz-Josef Land are very important.

The coldest months at Cape Flora were January, February, and March, when the thermometer, which did not register lower than − 43°, was down to that point, and the mean of the first two months was − 26°. In April the mean rose to − 1°·25, and in May, when an unusual quantity of snow fell, the mean was + 22°.

The southerly gales, with rises of temperature, had the effect of producing open water throughout the winter. Two days before Christmas the bay ice was broken up, and there was water within 300 yards of the shore. At New Year's Day there was open sea all round, and as far as the horizon, and about Bell Island, and this continued, to a greater or less extent, throughout the winter months.

The presence of open water of course ensures its being frequented by walrus and bears all the year round, and by flocks of birds during eight months out of the twelve. Whenever and wherever there was water, there also walrus were found, and as there was more or less open water in every month, this resource alone was sufficient to sustain life, while the fresh food thus afforded is the best antiscorbutic. But the water was too far off for them to get to it, over the hummocky ice in March, April, and May, and consequently they got no walrus in those months. During the winter twenty-four walrus were secured, besides five just before leaving the winter-quarters in June. Bears were also constantly prowling about during the winter, thirty-four were killed during the time that the explorers were in the hut on Cape Flora; and there were foxes during the same period. But it is worthy of remark that all the bears shot during the winter were males. The first female bear was shot on the 13th of March.

The first bird was seen on the 8th of February, and again on the 16th and 19th. It proved to be a snowy owl. Then the *dovekeys*, little black guillemots, made their appearance in the open pools of water as early as February 18th. On the 23rd there were flocks of birds, and early in March the looms and rotges were all coming back. An ivory gull appeared on April 20th, and snow-buntings a few days afterwards. In June brent geese began to arrive, and from April to June 500 looms were shot.

The experience of the Austro-Hungarian Expedition points to the total absence of deer, hares, and ptarmigan on Franz-Josef Land, and

this is corroborated by the observations of the *Eira's* crew. But only the south coast and Austria Fiord have been explored, and it may be that the Arctic land animals frequent valleys and beaches in some other part of what is evidently an extensive mass of land. The fact that reindeer either now exist on Franz-Josef Land, or once did roam over its valleys and crop the rich herbage of Cape Flora, has been established by Mr. Leigh Smith; for he found a portion of an antler.

The comparative abundance of animal life takes much from the terrors of a winter on Franz-Josef Land, because it reduces the danger of passing that season without a ship, and ensures immunity from scurvy.

In June the preparations for retreat were completed. There were four boats, two walrus-boats 20 feet long and two whale-boats 25 feet long. Each walrus-boat carried six men and tins containing 266 lbs. of preserved meats, 184 lbs. of soups, 204 lbs. of walrus and bear, 84 lbs. of biscuit, besides tea, milk, rum, and tobacco. One whale-boat carried seven men, the other six men and the dog "Bob," and they were provisioned accordingly. The preserved meats, soups, and biscuit had been reserved for the boat voyage, and were not used during the winter. Each boat had a chronometer and compass, a copy of Norie's navigation, a sextant or quadrant, telescope and field glasses, and a chart. Two of the boats were provided each with a rifle and gun, and the two others had each two rifles. All had plenty of ammunition, a sledge cooking-apparatus, a water-cask, and blubber for cooking; a bag of clothes, a tin soup-plate, tin mug and spoon, for each man; blankets and awning; an ice-anchor, five oars, an axe, two harpoons, one lance, two seal-clubs, two boathooks, mast and sails. Hot tea was made during the journey, morning and evening, and a hot dinner cooked daily.

On Wednesday, the 21st of June, 1882, the boats, provisions, and stores were taken down to the edge of the fast ice, a distance of about half a mile from the hut. The explorers then had tea in the hut, their last meal in the rough but effective shelter-place which had been their home for so many months. They left six bottles of champagne in the hut in case any one might call. The meal over, they blocked up the door, gave a hearty parting cheer, went down to the boats, and began to load them. Everything was ready by 9.30 P.M., the boats were launched, sail was made, and they went away before a strong north-west wind. The boats were very deeply laden and, there being a rough sea, they shipped a great deal of water. The men, however, easily baled it out, and were delighted at the rapid progress they were making southwards. No ice was seen until the following evening at 5.30, when the pack was sighted in latitude 78° 36′ N., being 80 miles south of Cape Flora. After working along the edge of the pack to the westward, for some distance, an opening was found, and the boats entered it at about 2 o'clock in the morning of the 23rd. There was then a gentle breeze from the south

which opened out the ice, but unfortunately brought a snow-storm with it, which filled the boats with snow.

At 8 P.M. on the 23rd the wind changed to the north, and the ice soon began to close up again, so that after going a few miles the boats had to be hauled up on a floe, to escape being nipped. There they remained until the end of the month, the thick fogs and tightly-packed ice making it advisable not to move. But in the meantime the north winds drove the pack, and the boats with it, a good deal to the south.

The 1st of July opened with a bright clear morning, and there were some leads in the ice. So the boats started at 4 A.M. The crews went zigzagging through narrow leads, dragging the boats over pieces of ice, and occasionally sailing through pools of water. Towards evening the boats were caught between two floes, and nearly crushed. But after an hour they again got into some open water, eventually hauling the boats on the ice for the night.

This was very severe work for the boats, which were much shaken, and began to leak badly. Some progress was made during the following day, the 3rd of July, which opened with a beautiful bright morning; but although there was water running east and west, nothing but ice could be seen to the southward. There was much laborious work in the following days, hauling the boats on the ice and launching them again until, on the 7th of July, they reached a more extensive lane leading south-west, in about latitude 77° 33′; but the next day the ice was closer, and one of the boats got nipped, stove a plank, and had to be hauled on the ice to repair. Similar laborious work occupied the time until July 10th, when at last there was more extensive water, which enabled the boats to make good a distance of 12 miles to the south and south-east. On the 11th the ice again closed in, and it was necessary to haul the boats up in latitude 77° 9′ N., and longitude 47° 5′ E. In this way gradual progress was made, with a great deal of hauling up, and across necks of ice, and launching again, all hands being required at each boat. On the 14th and 15th there was thick weather and heavy rain, the floes becoming very slushy and rotten, with plenty of pools of fresh water. On the 22nd there was a strong gale with snow, the water was quite rough, and the boats shipped several seas. The men got wet and were bitterly cold; but the progress was becoming daily more satisfactory, and on the 24th they were in latitude 75° 41′ N. They began to feel and see the swell of the ocean. Still, however, the ice stopped the progress southwards, and the severe work of hauling up the boats and launching, though not incessant, was still necessary.

On the 31st of July the ice was packed close and grinding together so that no progress could be made. But the floe on which the boats were hauled up was broken asunder, and the piece on which the boats

rested became not more than 100 feet long by 50, so in the evening they started again, rowing S.S.W. through open sailing ice. On August 1st the boats were again hauled up, and the piece of ice again broke in two. The boats drifted apart while the worn-out explorers were asleep. That evening they came to the edge of the pack and got into the open sea, rowing eastwards for the Novaya Zemlya coast. On the 2nd there was a heavy thunder-storm with rain, followed by strong wind and a high sea, so that the boats took in much water. But the perils of this long boat voyage were nearly over, and at 3 P.M. of August 2nd they sighted land after forty-three days. Since leaving Cape Flora they had killed two bears, three seals, and about 400 looms.

The boats were hauled up on the beach, near the entrance of the Matyushin Shar. Round the point were the *Willem Barents*, Dutch exploring vessel, and the *Hope*, under the command of Sir Allen Young, who had come out to search for and to succour the missing crew of the *Eira*. The little *Kara* was also in the strait, with Sir H. Gore Booth and Mr. Grant. So the explorers found themselves suddenly in the midst of friends, receiving a most cordial welcome from those gallant sympathisers who had come to those ice-covered seas to their rescue. All anxiety, all trouble, all danger were over in a moment and in the most pleasant way. Old and tried friends were there on the very threshold ready to supply all the wants of the long-missing explorers. It was with no ordinary feelings of thankfulness and gratitude on one side, of relief and welcome on the other, of delight and joy all round, that the group of friends met in the Matyushin Shar.

Thus the voyage, begun with such high hopes in June 1881, was finished. A valuable steamer, admirably adapted for ice navigation, was lost, and this undoubtedly is a very great calamity. But the principal objects of the expedition were fulfilled, and, in addition, much useful experience was gained during the winter, which was not contemplated. The facility with which the coast of Franz-Josef Land was reached on different meridians in 1880 and in 1881, forms an accumulating mass of evidence, when considered with reference to other voyages, tending to show that this recently-discovered region is a suitable base whence to push exploration northward towards the pole. The bergs on the south coast appear to have a prevailing drift westward, as would naturally be expected. It is a well-known Arctic canon that eastern shores of northern lands are more encumbered with ice than the western shores, and the voyages of the *Eira* point to the western side of Alexandra Land as the route along which the pole must next be approached. The discovery that the winter is comparatively mild along the southern coast of Franz-Josef Land, that there is more or less open water in every month, and that animal life abounds, is another valuable result of the expedition.

It may with truth be said that the *Eira* explorers, who wintered on

Cape Flora, who bravely endured so many hardships, and who encountered so many dangers, have not worked in vain. They have done their share, and a good share, in the advancement of geographical knowledge.

Extracts from Mr. Leigh Smith's Diary.

I. *Winter at Cape Flora, Franz-Josef Land.*

Aug. 22*nd*, 1881.—Getting stores on shore. Killed two bears. 23*rd*.—Bringing spars from ship. Shooting looms. 24*th and* 25*th*.—Collecting drift-wood. Shooting looms. 26*th*.—Began to build the hut. 28*th*.—Killed two walrus. 29*th*.—Building hut: finished the walls. Killed during the month after the ship was lost: two walrus, two bears.

Sept. 1*st*.—Boat to Eira harbour for salt, coals, and poles for roof. 2*nd*.—Two boats away after walrus: got two old, two young. 3*rd*.—Got four walrus. 4*th and* 5*th*.—Gale from the west. 6*th*.—Gale from the north. Put roof on the hut: got into the hut. 7*th*.—Put fire-place in hut. 8*th*.—Calm and warm. Plenty of water to go south. Got six walrus and one bear. 9*th*.—Foggy. 10*th*.—Snow and fog. 11*th*.—Fog and thaw. Ice back again. East wind. 15*th and* 17*th*.—Got a bear each day. 19*th*, 20*th*, *and* 21*st*.—Fetching ice from pond. 22*nd and* 23*rd*.—Smoke intolerable: building new fire-place. 26*th*.—Thermometer down to zero. 28*th*.—Mild. Killed during the month fourteen walrus, three bears. West wind.

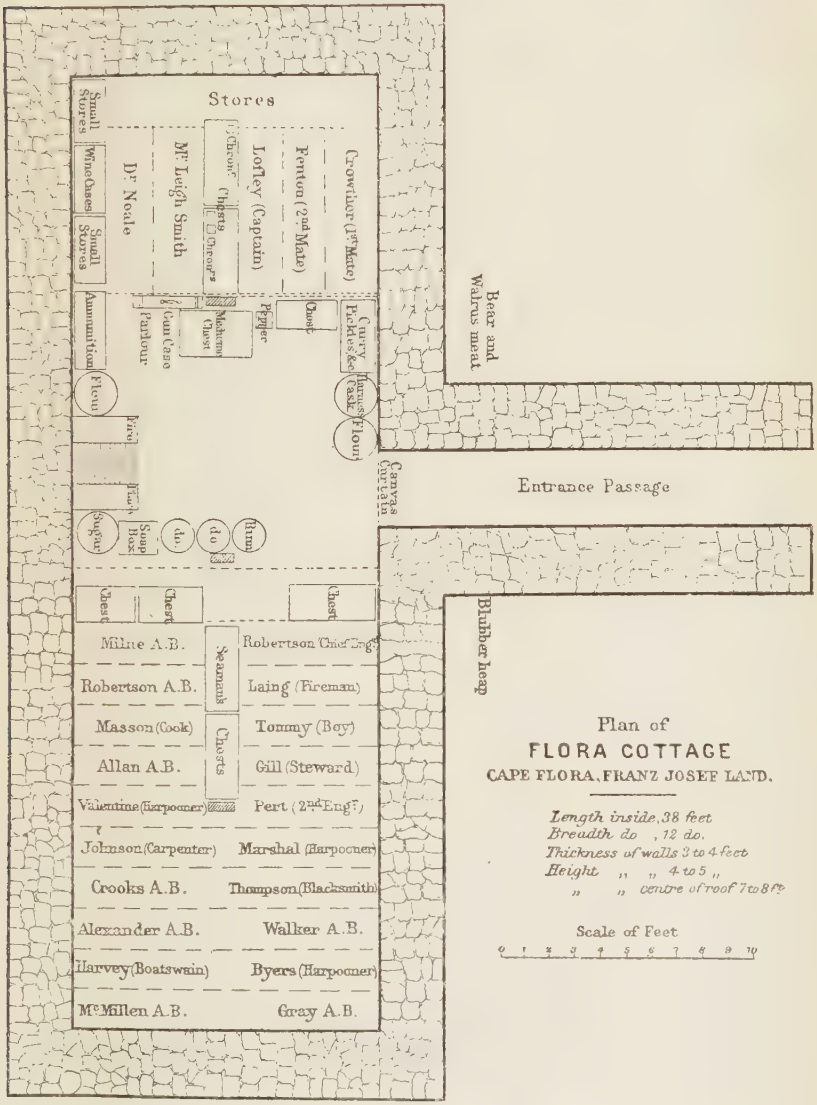
Oct. 4*th*.—Got a bear. 5*th and* 9*th*.—Plenty of open water. 10*th and* 12*th*.—Got a bear each day. 21*st*.—Took stock of provisions and made a reduction in daily allowance. Fine sunset. Got two bears in the evening. 22*nd*.—Sun did not rise. 28*th*.—Our retriever "Bob" found some walrus on the edge of the ice about 300 yards from the hut, we went down with all the rifles and killed five, but some of them got into the water and sank to the bottom, and had to be got up with harpoons fastened to long poles. 31*st*.—Got a bear. Birds have all left. Killed during the month five walrus, six bears. Temperature of the month: mean, + 8·95; highest, + 47; lowest, − 11.

Nov. 4*th*.—Got a bear. 11*th*.—Got a bear; five were seen. 17*th*.—Moon did not rise. 18*th*.—Began the coal to cook the dinner. 28*th*.—The thermometer is much higher than at the beginning of the month and we feel too warm indoors. 30*th*.—Rebuilding fire-place; it falls down occasionally and part of the wall of the hut near it has fallen in: killed during the month two bears. Temperature of the month: mean, − 1·25; highest, + 29; lowest, − 22.

Dec. 2*nd*.—Took stock of provisions. Bear and seahorse enough to last until March, I hope, and about thirty pieces of salt meat. All the tinned meats, about 1100 lbs. of meat, and 800 lbs. of soup, I want to keep for the boats going down. We have plenty of vegetables. 3*rd*.—Looms all gone; we had over 1000. 21*st*.—Four hours twilight: shortest day. General rejoicing. Men made a drum and had a concert. 23*rd*.—Bay ice broken up, and water up to the ground ice within 300 yards of the shore. 24*th*.—Christmas Eve: feast and singsong. 25*th*.—The thermometer rose to 31° outside: big dinner. 31*st*.—Canary died. Got no bears in December but saw several. Another feast and concert. Temperature of the month: mean, + 4·79; highest, + 31; lowest, − 24.

Jan. 1*st*, 1882.—Bright moonlight and aurora. Big dinner. 2*nd*.—Plenty of water to be seen in the offing. 3*rd*.—Water about Bell Island. Got a bear. 4*th*.—Water right round and as far as the horizon. Bear killed on hut. We estimate that there is a ton of blubber left. 8*th*.—Coal all gone, use blubber only. 14*th*.

—A bear shot, but he gave the dog "Bob" a hug before he died. *24th.*—Bob found five seahorse on the ice. We went down with four rifles and a gun, and succeeded in killing three before they got into the water. *25th.*—A bear followed



Plan of
FLORA COTTAGE
CAPE FLORA, FRANZ JOSEF LAND.

Length inside, 38 feet
Breadth do , 12 do.
Thickness of walls 3 to 4 feet
Height , , 4 to 5 ,
, , centre of roof 7 to 8 ft.

Scale of Feet
0 1 2 3 4 5 6 7 8 9 10

MR. LEIGH SMITH'S WINTER-QUARTERS.

Bob up to the hut and was killed. We have now enough meat and blubber to relieve us from all anxiety. Killed during the month, four bears and three seahorse. Temperature of the month: mean, – 25·7; highest, – 4; lowest, – 43.

Feb. 1*st.*—Open water. 4*th.*—Shot a fox. 5*th*, 6*th*, 7*th.*—Very stormy. 8*th.*—Walrus playing about in the water. First bird seen, most likely a snowy owl. 10*th.*—A bear killed in front of hut. 16*th.*—A bird seen. One of the sailors shot a walrus on the ice and came back for assistance, but when we got to the place the walrus was in the water, and we could not get him. 16*th.*—Fetching ice. Beautiful day. Water by Bell Island. 18*th.*—Beautiful day. Seahorse and flocks of dovekies seen in water. 19*th.*—A snowy owl seen. Moon up. 20*th.*—Bear seen going into a hole on the face of the hill; three men went up with the repeater rifle, but it froze and would not go off. Bear seen on the floe, grand chase, but he got away. Walrus seen in the water. 21*st.*—Sun back again, but the sky was cloudy and we could not see it. 22*nd.*—A bear came, was wounded, but got away. 23*rd.*—Flocks of birds seen flying and in the water. 24*th.*—Open sea. 25*th.*—Saw sun for the first time. 27*th.*—Saw flocks of birds. Sun set at 2.45. 28*th.*—Stock of fresh meat will not last a month; made a reduction. Killed during the month one bear. Temperature of the month: mean, −26·7; highest, +25; lowest, −43.

March 1*st.*—Three bears seen. 2*nd.*—Bear came but got away. Walrus seen. Rotges seen. Another bear seen. 3*rd.*—A bear killed close to the hut; the nineteenth. 4*th.*—Scraping snow off inside of hut, two inches thick. Ten days since it was done. 5*th.*—A bear seen. Birds seen flying to the west. A burgomaster seen. 7*th.*—A bear killed, No. 20. 9*th.*—Birds seen flying west. Looms seen flying south. A female bear and cub killed. All bears killed in the winter were males. 10*th.*—Looms and rotges seen. Saw a seal. 11*th.*—Got six dovekies. A bear seen. 12*th.*—A goose or duck seen. Rotges seen. 13*th.*—A female bear got, No. 23. 20*th.*—Rotges seen on hill. 23*rd.*—Put skylight into roof. 26*th.*—Looms on hill. A bear got, No. 24. 27*th.*—Two bears got, Nos. 25 and 26. A little water seen up Gunther Bay. 28*th.*—Cracks, with a little water outside of land-floe. 29*th.*—A bear came but got away. Looms on hill. Killed during the month, eight bears, six dovekies. Temperature of the month: mean, −1·4; highest, +24; lowest, −43.

April 4*th.*—Some men went to the top of the hill, saw water up Nightingale Sound and to the west and south, but a long way off. 6*th.*—A bear killed, No. 27. 10*th.*—Water about six miles off. 16*th.*—Two bears seen. 17*th.*—Blubber getting short. Began to use wood again to cook the dinner. 18*th.*—Got a bear. We are all delighted, as the stock of fresh meat was getting very low and the blood all used up. Men up the hill shooting looms, got twenty-seven looms and three rotges. Beautiful day. 19*th.*—Got a bear but he was very thin, No. 29. A snowy owl seen. Beautiful day. 20*th.*—A snow-bird seen. A falcon seen. Beautiful day. 24*th.*—Two snow-buntings seen. A molly seen. A bear killed, No. 30. 28*th.*—Walked round the hill, killed twenty looms. Splendid day. 29*th.*—First mate and some men went to the top of the hill behind the hut, they took the aneroid barometer with them, and found the hill to be 1300 feet high. They could see water to the south and south-west a long way off. 30*th.*—Had "doughboys" for the last time, there is a little flour left, but we shall use it to thicken the soup. Killed during the month four bears, fifty looms. Temperature of the month: mean, −1·25; highest, +23; lowest, −18.

May 2*nd.*—A bear got. We are very glad, as we were much in want of blood and blubber. 5*th.*—Killed fifty-two looms, fired seventeen shots. 6*th.*—Killed forty-one looms, fired seventeen shots. 7*th.*—Got a bear, No. 32. Killed eighteen looms, fired three shots. Sugar all used. 9*th.*—Blubber all used up. 10*th.*—Very little fire-wood left. 11*th.*—Began to make sails for the boats and to get ready for starting. 13*th.*—Walked across the floe towards Cape Gertrude, found the snow

hard and easy to walk over. 15*th*.—Put skylight in our bedroom. 16*th*.—Killed twenty-eight looms, fired thirteen shots. 17*th*.—Took the roof off the porch. Walrus meat all used up. No water to be seen. 18*th*.—Snow is now melted in the kettles during the cooking, so we do not have a fire at night. 19*th*.—Have not seen a bear since the 7th of this month. 20*th*.—This is the day the Austrians started in their boats. Killed thirty-seven looms, fired thirteen shots. A lane of water about six miles off. Only three weeks' fresh meat left. Got a fine bear, No. 33. Never more pleased. 21*st*.—Pools of water up Gunther Sound. Killed forty-five looms, fired fifteen shots. 22*nd*.—A bear seen. Water comes in near Bell Island. A crack one foot wide in the ice about a mile off. Killed eight looms, fired three shots. 24*th*.—Water nearer, and runs south-west as far as we can see. Queen's birthday, put up flags and drank her health in champagne. 27*th*.—Burning a hatch, firewood all used up. Strong gale blowing out of the sound. Snow-storms all the week, we are more snowed up than we have ever been. 28*th*.—Went after a bear but he ran away. Killed 137 looms, fired thirty-nine shots. 29*th*.—Breaking up casks for firewood. 30*th*.—Getting out whale-boat. We had much snow, wind, and drift in the latter part of May. Killed during the month three bears, 366 looms. Temperature of the month: mean, + 28·85; highest, + 36; lowest, 0.

June 1*st*.—Water about five miles off, running east and west, and at least 10 miles broad. Burning all the wood we can get out of the hut. 3*rd*.—Got a brent goose. Only about two weeks' fresh meat left. 4*th*.—Killed 100 looms, fired thirty-one shots. 5*th*.—Captain Lofley says we could launch the boats across the ice into the water in three days, so I have sent some men away to find a road, but I do not believe it can be done. Men came back late at night, but did not get to the water. 6*th*.—Captain Lofley went to look for a road, but found the ice too bad for dragging the boats over. More water up Gunther Sound. 7*th*.—Valentine went to find a way to the water, but did not get to it. 8*th*.—Our fresh meat is getting very short, and if we do not soon get a bear, we must start for the water to try and get walrus. Killed five looms, fired four shots. 9*th*.—Got a young bear after a long chase, No. 34. Ground soft and muddy, and water standing in small puddles. Valentine went up the hill to shoot looms; he came down and said that the ice had broken away to the south-east, and that he could get to the water in an hour; he started with two men, and was away five hours, but did not get to the water. Walrus seen on the edge of the ice to the south-west, where there is a bight. 10*th*.—Got some water off the land to-day. Boats nearly ready. 11*th*.—Walked to the glacier and went up it. There are many large pools of water up Gunther Sound, and the floe seems to be decaying fast. 12*th*.—Went with Valentine over the land-floe, but found it too hummocky for the boats. Every man now has a loom with his dinner. 13*th*.—It has been blowing a whole gale outside. Ice broke up in Gunther Sound, and a crack opened out about half a mile in front of our door, and then widened until it was at least a mile broad right away to the outside. Now we are free. We must get a few walrus. I hope to make a start on the 21*st*. 14*th*.—A year since we left Peterhead. Sent boat over to Eira Lodge to fetch salt, cooking apparatus, &c. 15*th*.—Boat went away after seahorse, got one. Boat returned from Eira Lodge with salt, sledge, cooking gear, and four walrus. 16*th*.—Began to cook walrus meat and looms for the boats. White whales seen going west. 17*th*.—Ice breaking away from land-floe. Cooking and tinning walrus. Snow is disappearing very fast round the hut. 18*th*.—Cooking and tinning walrus meat. Found the 14 lbs. lead, it will make slugs for 200 cartridges. We have to bale out the water in the hut. Hope to be ready to start on Wednesday. 19*th*.—Blowing hard outside. Thick water sky to south-west. 20*th*.—Men went up hill to get eggs, but the rocks gave way under their feet, and they only got two.

II. *The Boat Journey to Novaya Zemlya.*

On Wednesday, June 21st, the boats, provisions, and stores were taken down to the edge of the fast ice, about half a mile from the hut After having tea in the hut we blocked up the door, and with a cheer went down to the boats and commenced to load them. At 9.30 P.M., everything being ready, the boats were launched and sailed away with a strong north-west wind; the boats were deeply laden, and there being a good sea on, they shipped a great deal of water, but it was easily baled out, and we were delighted at the rapid progress we were making south. No ice was seen until the following evening at 5.30, when the pack ice was sighted in lat. 78° 36′, being 80 miles south of Cape Flora. After working along the edge of the pack to the westward for some distance an opening was found, and the boats went in about two o'clock on the morning of the 23rd. There was then a gentle breeze from the south which opened out the ice but unfortunately brought a snowstorm with it which filled the boats with snow and made us rather uncomfortable. At 8 o'clock P.M. the wind having changed to the north, the ice began to close up again, so that after going a few miles the boats had to be hauled up on a floe to escape being nipped; there they remained until the end of the month, thick fogs and tightly packed ice making it advisable not to move, but meantime the north winds drove the pack and also the boats much to the south.

July 1*st*.—Bright clear morning. Started at 4 A.M. Went zigzagging through leads, and dragging the boats over pieces of ice, and occasionally sailing through pools of water all day. Latitude at noon, 78° 2′. At 6 P.M. the boats were caught between two floes about four feet high above water, and nearly crushed. At 7 P.M. we got into a big water. At 11 P.M. could not get any further, so hauled the boats on a floe. Found fresh water on the floe for the first time. We have had to melt snow in our kettles since we started, to get water for drinking and cooking.

2*nd*.—Beautiful day, but the ice is too tight to let us get on. The boats are much shaken by yesterday's work, and leak badly.

3*rd*.—Beautiful bright morning. Started at 9 A.M. After some hauling got into a hole of water, then through leads into a larger water; after that went some distance through very hummocky and heavy ice. Stopped for dinner. After dinner went along the side of a large floe for about a mile, then hauled the boats on the ice. Got a seal.

4*th*.—Another bright clear day. There is a large water now running east and west of us, but the edge is quite tight, and we can see no water south of it.

4*th*.—Latitude at noon 77° 57′. We have not gained much by all our labour, and our boats are getting very shaky. After tea sailed east to the end of the water. Saw another large water to the east, but could not get to it. Hauled the boats on a floe at 9 P.M.

5*th*.—After breakfast started for the water east of us. After a great deal of poking through cracks, hauling and launching, got to the water about 6.30 P.M., sailed across it, hauled boats on a floe at 7.30 as it came on very thick. Fell through the floe and got a ducking.

6*th*.—Overcast all day. After dinner started and went through some bad leads into small holes and then into some better. After tea got into a long water but it took us mostly to the west.

7*th*.—Started after breakfast. After some difficulty got into good leads and holes of water, went south and west. Stopped at 10 A.M. Latitude at noon 77° 33′. Got into a large water and again made to the south and west. Stopped again. Went

a little further, then got stopped again ; hauled up for the night. Overcast until mid-day, then bright and clear. We had four biscuits each to-day.

8*th*.—Bright clear morning. Started at four o'clock but could not get far. Went a little way after breakfast, lat. 77° 20′. After dinner had a good run south and south-east. After tea went about half a mile when our boat got nipped and stove a plank; hauled up on ice to repair.

9*th*.—Started at 8 and went on until 11 A.M. but did not do much. Light snow in the morning. Afternoon bright and very hot. Went a short distance after tea. At 10 P.M. started again and went through some bad ice.

10*th*.—Came to a large water which opened out into others so that we made about twelve miles to the south and south-east by 6 o'clock A.M. Latitude at noon 77° 11′. Very hot. Started at 6 P.M., went on until 11 P.M., but did not do much.

11*th*.—Morning overcast. Ice close. Started in the evening, but did not get far before our boat got nipped, and had to be hauled on the ice.

12*th*.—Started at 9 A.M. Nearly got nipped again, but hauled the boat over the ice to where the others were. Lat. 77° 9′, long. 47° 5′. Two men went up a berg to look for the open water. Saw a bear, but he would not come near us. In the evening went through some leads and got into a large water going W.S.W., which opened into a water going south, and then into others.

13*th*.—Went on until 2 A.M. Ice open, and went on again at 8; at 9 came to a stop, and hauled boats on a floe. Lat. 76° 55′. Started again at 4 P.M. Sailed south a little way, then west, then rowed to the east, and after a good deal of launching sailed south-east for some distance.

14*th*.—Launched the boats across several necks, and then sailed south-west; stopped at 4 A.M. After dinner launched the boats into a good lead, and went south about two miles. Could see a dark water sky south-west. Boats nearly nipped. Heavy rain. Blowing a gale.

15*th*.—Strong wind, thick weather, and much rain, so that we could do nothing but wait. After dinner went on for about two hours, then stopped, as it was too thick to see the leads. Rained hard.

16*th*.—After dinner went a short way. The floes are very slushy and rotten, and there are plenty of pools of fresh water. After tea went on until 8 P.M. Started again at 10, when the ice opened.

17*th*.—Went on through good leads and large waters, only having occasionally to poke through narrow cracks and haul over necks until 8 o'clock. Much brash ice about now. Started again at 6 P.M. Sailed through some large ice-holes, and got through some cracks, and hauled over some necks. Stopped at 11.30 P.M.

18*th*.—Ice tight all the morning. Blowing hard and thick. Ice slacked off, and we started at 3.30 P.M. Went through some good large waters south and east. Saw narwals and white whales. Got a bear. Camped at 10 P.M.

19*th*.—Started at 10 A.M., and went down a long lane, with a few stoppages. Stopped for dinner. Lat. 76° 38′, long. 46° 48′. Went on through some good leads and large waters until 8 P.M.; could see a large water south. Got a seal. Got a bear.

20*th*.—Thick. Strong wind and very heavy rain all the morning. Started after tea, but it was too thick to see our way, so at 8 P.M. we hauled boats on a floe and camped.

21*st*.—Thick. Started after breakfast, but after nearly getting nipped three or four times, hauled the boats on the ice, as we could get no further. Heavy rain. Went on from 10 P.M. to 11 P.M., but the ice was flying about too much and the wind too strong.

22*nd*.—Strong wind and snow. Started at 10 P.M. Sailed through large waters

south-west and south, quite rough water, shipped seas, got wet, bitterly cold, stopped at 12.

23*rd*.—Overcast, but all the holes of water were reflected in the sky. Started at 8 A.M., and after going west for a few miles got into leads and pools leading south and south-east. Lat. 76° 10′, long. 46° 45′. Went on all day sailing and rowing; in the evening went too much to the east in trying to keep from getting outside, and got jammed.

24*th*.—Hauled the boats on the ice at 1 A.M. Started at 8 A.M. and went west at first, then south, and got into sailing ice, and then had no difficulty in going south and east. Foggy at times, but sun shining and a fair wind, and we sailed along delightfully. Lat. 75° 41′.

24*th*.—In the afternoon the ice got more open, and we could feel and see the swell of the sea. Sailed south-east true all night. Foggy.

25*th*.—Sailed south-east true all the morning until 9 o'clock, then E.S.E. true, got into open water. Rain. Came into the ice again at noon. Wind fell at 4 P.M., began to row to the east, went on all night, but it came on very thick.

26*th*.—Had to come out again as we could not get into the land. Worked about trying to get out of the ice to go south, but could not find a lead. Lat. 75° 0′. Fine and clear. Still working out but doing little good. Foggy. Made fast to a piece of ice about 4 P.M.

27*th*.—Started at 7 A.M. Fine morning. Sailed south for some time, then had to tack to clear the ice, but the whale-boats went so much to leeward, that we had to pull to windward. Pulling all the afternoon to the west; at last cleared the close ice and sailed south. Sailing all night. Foggy.

28*th*.—Sailing all the morning to the south through open ice for the most part, came to where there was a long heavy swell coming in from the S.S.W. Could have got out into open water, but thought it best to keep inside and work to the south and east along the edge. Working through very open ice all the evening to the south, and then to the east, but at last went too much into the pack.

29*th*.—After trying to work out to the edge, the ice closing in, hauled boats on a floe at 3 A.M. Foggy. Started at 2 P.M. Worked eastward and southward all the afternoon, mostly through very open sailing ice.

30*th*.—Fog came on at 1 A.M., so hauled boats on a floe and turned in. Started at 1.30 P.M., and sailed a short distance east and south, but soon came to a stop, as the south-west wind packed the ice close. Ice heaving and grinding about all night. Long swell coming in.

31*st*.—Ice still packed close, and grinding together from the swell, so that we cannot get away. The floe on which we hauled up has been broken to pieces, and the bit on which our boats are is not more than 50 feet by 100 feet. Lat. about 73° 40′. Started at 10 A.M., and sailed west and south until 8 P.M., then brailed up and rowed about S.S.W. true all night through open sailing ice.

August 1*st*.—Rowed on until 3.30 A.M., then hauled up on a bit of ice, which broke in two, so that the boats drifted apart while we were asleep. Started at 9.30 A.M., and rowed south until 4 P.M. through very open drift ice. Had tea at 5, then started to row south-east, and at 8 came to the edge of the pack, and got through into the open water at last, then after clearing a point-end rowed east for the rest of the night.

2*nd*.—Rowed on until about 3 A.M., then set sail. At 8 A.M. heavy thunderstorm and rain. At noon strong wind and high sea, boats taking in much water. Sighted land about 3 P.M. Landed 8 P.M.

3*rd*.—10 A.M. "A sail! A sail!"—the *Willem Barents*.

Previous to the reading of the foregoing—

The PRESIDENT said he was sorry to have to announce that he had received a letter from Mr. Leigh Smith, stating that he was suffering from a cold, and was quite incapable of reading the paper. In the absence of that gentleman, he was glad to say that Dr. Neale, one of his companions, both in the voyage of 1880 and that of 1881, had kindly undertaken to read it. Dr. Neale had charge of the health of the expedition, and the best guarantee of his fitness for that duty was that he brought home the whole of the crew safe and sound, with the exception of one sailor, who went out afflicted with a cancer, which he knew must sooner or later prove fatal. Mr. Leigh Smith was well known to them, though not personally, because they had never had the good fortune to bring him face to face with the Meeting. He had received the gold medal of the Society, and was so well known by reputation, that it was unnecessary for him (the President) to say much in introducing his paper to them. They all knew that his latest expedition, which had excited so much interest, was very far from being the first in Mr. Leigh Smith's adventurous life. As early as 1872, he went to Spitzbergen, and considerably extended our knowledge of that country—rectifying many errors which up to that time had prevailed respecting it. Subsequently he made two other voyages. One of them was not fertile in results; but in the other he accomplished the satisfactory feat of rescuing a large number of Swedes who, but for his assistance, would have been starved to death. As most of them were aware, Mr. Leigh Smith was the first person, in his own yacht fitted out at his own expense, to reach Franz-Josef Land in a ship. The land had been discovered and reached by the Austrian Expedition when their ship was shut up in the ice 10 miles away, but they were unable to prosecute a voyage of discovery along the coast. The investigation of the character of the west coast was a matter of importance, it being an accepted axiom among Arctic travellers that the best chance of approaching the North Pole was by following the western coast of the land. Mr. Smith, knowing that, considerably extended the knowledge of Franz-Josef Land, returning the same year, after exploring about 150 miles of new coast. What he accomplished last year would be detailed in the paper to be read.

After the paper—

Sir ALLEN YOUNG said that all Arctic authorities would agree as to the good results which had accrued from Mr. Leigh Smith's late expedition. It proved how much a party of resolute men could effect, even when their ship had suddenly sunk under their feet, and at the worst season of the year, when the young or new ice was forming and the old ice not sufficiently compact to attempt a sledge retreat, even if the party had been provided with a travelling equipment. It was immensely to the credit of the expedition that they at once set to work to land such provisions as they could save, and attempt to provide for the winter, which they passed through without any real sickness, although they had to depend chiefly on their rifles for such provisions as they could obtain, beyond the small quantity of flour, rum, and tea which they had saved, and notwithstanding that they had no lime-juice. They had also shown how a retreat could be made. He looked upon that retreat as one of the most extraordinary that had ever been accomplished, and especially after seeing the boats on their arrival in Novaya Zemlya. Their sails were made of the table-cloths, and their compasses and instruments were fitted up in the most extraordinary way; they had nothing left by way of provisions excepting some walrus meat done up in tins, and had no clothing excepting ragged remnants of the summer clothes in which they had left England. The great point which Arctic navigators would be most interested in was the everlasting question of the routes to the pole. He was not one of those who believed that Englishmen were going to give up their attempts to reach

high latitudes and let foreigners do it instead. It was clear that they had come very nearly to the end of their tether, so far as navigation by ships was concerned, and they must now trust for future explorations to sledge journeys; but for that they must have smooth ice; heavy loads could not be dragged over oceanic ice. Franz-Josef Land now appeared to be the only land, extending far to the north, by which such journeys could be made. So long as the land ran north and south, the sledge journey could be continued, close to the coast, in the bays, and inside the lines of hummocks formed by the rise and fall of tide, but the moment they had to strike off over the ocean they came to a heavy pyramidal pack of ice, with soft snow in the interstices, over which it was impossible to pass. Franz-Josef Land appeared to offer all the conditions required for sledge journeys. The paper had described the wonderful fiords and inland channels, as smooth as a bowling alley, and corroborated what Captain Payer had said, "that travelling would be very easy there." Captain Payer, from the most northern point he reached, saw the land still away to the northward, and that being the case, great hopes were held out that by this route a still higher latitude might yet be reached. At the same time Mr. Leigh Smith had shown that there was every hope that a good ship might reach Franz-Josef Land in an ordinary summer, and that even if the ship were lost the crew might sustain themselves, and escape by their boats. He trusted that Arctic explorations would still be continued.

With reference to the *Hope* expedition, he attributed its happy termination to Mr. Leigh Smith's own resolution, determination, courage, and foresight in carrying out what all Arctic explorers thought he would do, namely a retreat on Novaya Zemlya. He (Sir Allen Young) felt certain that Mr. Smith would, if possible, do so. It almost seemed as if it had been arranged that they should meet there. Of course he did not know, at the time, where Mr. Leigh Smith was, or whether he was alive or dead. It was, however, most fortunate that he was picked up at that time and place, because the *Hope* was going to leave for the north the very next day, and if they had not met at that time, the *Hope* expedition might now be up in Franz-Josef Land, and her ship's company living on walrus and bear, while Mr. Leigh Smith was quietly enjoying the hospitality of the Royal Geographical Society. He (Sir Allen Young) was actually writing a letter, and preparing provisions to place in a cairn, when suddenly Mr. Leigh Smith appeared on the other side of the bay. He could not lose this opportunity of expressing his great thanks to the promoters of the relief expedition for the handsome and liberal way in which resources were placed at his disposal. He had everything that he could possibly want. The consequence was that he was amply equipped and could have held out for three years if necessary. They were very much indebted to the distinguished foreign officers who gave them very valuable advice before they left: he alluded to Baron Nordenskiöld, Commodore Jansen, and Captain Payer, all of whom had written letters containing most valuable suggestions, but all pointing to the same reasoning, namely, that if Mr. Leigh Smith was alive and had his boats, he would probably try to reach the west coast of Novaya Zemlya. One supposition was that he might have gone to Spitzbergen, but it was not insisted upon. He also expressed his thanks to the Lords Commissioners of the Admiralty, for allowing very experienced naval officers to accompany him, namely, Lieutenant Swire, R.N., Lieutenant Casement, R.N., Lieutenant Bairnsfather, R.N., and Dr. John Price. Those officers rendered him great assistance, especially on one occasion, when the *Hope* struck on a reef in the open ocean. There was no broken water to indicate its presence. They were obliged to keep as near the coast as possible in order not to miss any boats or indications of any parties on shore, and in doing so they ran right on the reef when going eight knots an hour, and it was twenty-four hours before they could extricate the ship. He also had to acknowledge

the noble conduct of Captain Hoffman, of the *Willem Barents*, which has gone every summer into the Barents Sea sounding and taking observations for the last three years. After escaping from the reef the *Hope* was taken back into Matotshkin Straits to repair some serious damages before finally sailing northward for Franz-Josef Land, and there the *Willem Barents* was met. Captain Hoffman placed his carpenters at his (Sir Allen Young's) disposal to assist in the repairs, and was in company with the *Hope* when Mr. Leigh Smith and his party were rescued and the mission of the relief expedition so happily ended.

Mr. A. Craig Sellar, M.P., wished on behalf of Mr. Leigh Smith's friends and relatives, and as a connection by marriage, to express their thanks to the President and Council of the Royal Geographical Society, and to the many other gentlemen who exerted themselves to such good purpose last year in fitting out the *Eira* Search and Relief Expedition. In the paper which Dr. Neale had just read, they were told how Mr. Leigh Smith and the crew of the *Eira* spent the long winter and spring from October 1881 to July 1882 in their hut on Cape Flora. It might be interesting to relate how Mr. Leigh Smith's friends spent the same period living here at ease in England. At the end of 1881 when there were no tidings of the *Eira* they were naturally very anxious and alarmed, knowing that he had only fourteen months' provisions with him, and had expressed his fixed intention to return home in October unless prevented by unforeseen circumstances. A provisional committee was appointed consisting of Sir Allen Young, Mr. Clements Markham, Sir Henry Gore Booth, and Mr. T. V. Smith, to consider whether they could interest the Royal Geographical Society, and if possible the Government, in the fate of Mr. Leigh Smith and the crew of the *Eira*. The Committee first applied to Lord Aberdare, as President of this great body, to enlist his sympathy and the influence of the Society in their object. Both by the President and by the Council of the Society they were accorded an attentive hearing, and on a statement of their case they received many valuable suggestions, and also the offer of a large grant of money in aid of a relief expedition. But the President's services did not end there. He went with an influential deputation to Lord Northbrook and the Lords of the Admiralty, and by the strong expression of his opinion, backed by that of the Society, persuaded the Admiralty that there was an urgent case for the Government to intervene and render assistance, and a considerable grant of money was offered. The debt of gratitude which Mr. Leigh Smith's friends felt to the President was more than he could express, because from that time the anxiety which they suffered was to a very large extent relieved. Preparations were then made for the relief expedition, and in a very short time the provisional committee developed under the reassuring promise of the Geographical Society and the Admiralty into the "*Eira* Search and Relief Committee," consisting of Sir Henry Gore Booth, Mr. Grant, Mr. Clements Markham, Sir George Nares, Mr. T. V. Smith, and Sir Allen Young. The thanks of Mr. Leigh Smith's friends were especially due to the Lords of the Admiralty for the confidence they reposed in that Committee. The grant was given without any trammels or restrictions except two. One was that an equivalent sum should be subscribed by Mr. Leigh Smith's friends; and the other was that the instructions to be given to the commander of the expedition should be laid before two experienced officers appointed by the Admiralty. The first requirement was at once discharged by the munificent liberality of a friend of Mr. Leigh Smith, who does not wish to have his name publicly mentioned; and the second condition was fulfilled by the submission of instructions prepared by this Committee to Admiral Sir G. Richards and Captain Beaumont, who had been named by the Admiralty, to whom he wished to express the gratitude of the Committee for the great assistance they afforded, the suggestions they made, and the kindly interest they took in the expedition. It was

then that Sir Allen Young offered his services to the Committee as commander of the expedition, and it was no light matter for a man full of business occupations and engagements, with no personal ambition to gratify, and no promotion to secure, to undertake such a charge, knowing well what a grave responsible task it was. It was not as if Sir Allen Young was inexperienced, and did not know the risks he was running, for he had been on several expeditions to the north before. From the moment he entered upon the task everything went on apace. A good vessel, the *Hope*, was obtained, a suitable crew, and an admirable staff of officers volunteered for the service. As the representative of Mr. Leigh Smith's friends and relatives he wished most cordially to express his thanks to all the gentlemen who aided and assisted, and he would ask the President to add one other kindness, and convey the expression of their gratitude for the generous way in which they acted and the confidence they reposed in the *Eira* Committee, to the Council of the Society, to Lord Northbrook, and the Lords of the Admiralty.

Admiral Sir Leopold M'Clintock said that apart from the lively satisfaction which must be felt at the safe return of Mr. Leigh Smith's party and those who so gallantly went out to the rescue, every one interested in geographical exploration would be gratified at noticing two points. Looking back for a number of years it would be seen that the search for a missing expedition was continued over a period of twelve years; whereas it was found in 1882 that hardly was an expedition missing when at the proper season of the year out went a relief expedition and proved successful. The accumulated experience of many years tended greatly to lessen the risks of Arctic explorations, but they still were something tremendous, though the exploring party could now do a great deal to effect their own relief, and the rescuing party could do a great deal to anticipate their movements. The happy result of the *Eira* Relief Expedition was greatly owing to the Arctic experience and sound judgment of Sir Allen Young who had brought it to so prompt a conclusion.

Captain Sir George Nares said they had listened to the history of a most instructive voyage told in a very modest way, and he was sure that there was plenty of room to read between the lines. The only voyage that he knew of that was at all similar was Barents' historical voyage round the north-west coast of Novaya Zemlya. In the same way Barents left his ship behind him; in winter his crew had to exist on the animals that they could shoot, and they retreated in their boats, but with the melancholy difference that Barents was left buried on the return journey. With that exception the voyages were precisely similar. The story that they had listened to said very much for the character of the leader of the expedition. The tact and ability that he must have shown all through in keeping hope alive amongst men abandoned on a desolate shore, without provisions, and in maintaining discipline during the winter, stamped Mr. Leigh Smith's character in a very prominent way. The captain of a man-of-war was very differently situated from the captain of a merchant ship, or any one in Mr. Leigh Smith's position. Immediately a merchant ship, or a whaler, or such a vessel as the *Eira*, was wrecked or sunk, "Jack was as good as his master." That was the English law. Whoever became the leader of the party when such a thing occurred must have stamped his character amongst his followers before the occurrence took place; and the story they had listened to showed that in Mr. Leigh Smith's case the trust was worthily placed. In the few lectures which he (Sir George Nares) had given about Arctic service, he had always held out that it was not so bad in the reality as in the contemplation. That was all very well with a comfortable ship as a home, but it was impossible for him adequately to express what these poor fellows had gone through. Let any one imagine himself for a long winter in a hut constructed of stones and turf and driftwood. They had heard a great deal about Mr. Leigh Smith's party being able to get animal provisions,

but they had not heard how those provisions were cooked, or how light was obtained, or how they warmed themselves, or anything of that kind all through the four long months that they were in darkness. There was no light in the hut except enough to make darkness visible, and nothing had been said about a single book being read: the privations of educated men under such circumstances must have been of a very extreme character.

He did not want to say anything to check Arctic enterprise, but at the same time it was his duty to point out the great hazard that was run when vessels went forth without preparing a base and a line of retreat. The story of the *Eira* and the *Jeannette* would show what risk was run when such precautions were not taken in Arctic voyages. There was no doubt that if Mr. Leigh Smith's ship had not been wrecked in the very position in which she went down, a very different tale would have been told. A remark had been made in the paper about the difficulty of pulling the boats over the ice. Throughout the journey the boats had only to be pulled over a few feet of ice at a time, but had the explorers been 100 miles east or west of Eira Harbour it was impossible to say where they would have been now. The extreme importance of Eira Harbour as a base for future journeys northward had been proved. It was an admirable position, with plenty of animal life, and open water, and no doubt some good use would be made of it at no very distant time. The open water was remarkable, but the experience of the *Tegetthoff* foretold it. There was now no doubt that at Eira Harbour open water existed earlier in the season than in the shut-up seas that had usually been navigated north of America. The information given in the paper with regard to animal life was most important. If there were plenty of bears and walrus, then open water must be there always. Another proof of this was the early coming of the looms. Everybody was astonished when Lieutenant Payer stated that in his journey up Austria Sound he found a loomery about six weeks before any other part of the Arctic regions was visited by those birds. But now that open water was met with on the southern shores of Franz-Josef Land nearly all the winter, the reason was clear. He must confess that in the advice he gave to the Committee he did not expect open water south of Franz-Josef Land in June. In shut-up seas north of America there was no such thing as open water before July, and it was an entirely new experience to be able to start on a boat journey early in June. The Obi, Yenesei, and the Mackenzie never broke up until the 1st of July. The reason why the ice broke up earlier near Franz-Josef Land must be that it was blown away, or that the current carried it away. Had the retreating party not started so early in the season, before the northern ice had broken up and drifted south, they would, he thought, have experienced far greater difficulties with the boats. The announcement in the paper about the male bears was rather interesting: Lieutenant Payer made the same remark—that the female bears were absent all through the winter. One very important question that remained for them to solve was, where the icebergs went. It was only drift ice that came down south of Spitzbergen, and he supposed that the icebergs went up between Spitzbergen and Franz-Josef Land. The one point in the paper with which he found fault was the Arctic canon which was laid down. The Arctic was changing so completely in different districts, that fixed rules could not be laid down. It was said that the west coast would always be the best to start upon, but he did not believe that was so, for he thought that Alexandra Land up to Cape Lofley would be jammed up by ice. During the whole of his work up to the north of Smith Sound he stuck to the west shore of the sea and the east coast of the land; they must therefore be careful about laying down Arctic canons. It appeared that the explorers found a raised beach 90 feet high, and if they supposed the land there sunk 90 feet the whole of the Arctic regions in that part would be totally changed.

For instance, if they could remove the whole of Spitzbergen it would be very much easier to get to Franz-Josef Land or beyond. What was wanting was a route by which the ice from the Polar ocean could get away, and such a state of things did exist not very many geological years ago. At the north of Smith Sound he found traces of ancient beds 1000 feet above the level of the present sea. If the land in the Arctic seas was lowered to that extent very nearly the whole of Spitzbergen would be sunk as well as the whole of the north of Asia and a great part of Norway. He wished to express admiration as to the nobleness of Sir Allen Young, who came forward when his friends were in difficulties, gave up the whole of his engagements, and went out to rescue them. There was no doubt that Sir Allen's instructions allowed for his meeting his friend on the journey home, but at the same time he was prepared to go wherever necessity called him. Sir Allen Young had told them that the *Hope* got severely handled, but he had not said that not only the rudder was knocked away, but the rudder post, and that they chained the post up again, made a temporary rudder, and were ready to start to the north in that condition.

He would remind them of an expedition that was now wintering in the northern seas. They had heard about the happy way in which Mr. Leigh Smith had got south, but there was a failure last year about which very little had been heard. A United States expedition under Lieutenant Greely with twenty-five men had been left in Discovery Bay, Smith Sound, in the summer of 1881. A vessel tried to reach them last summer and bring them home, but she failed. He only hoped that their friends would be more fortunate next year; and that their rescue would be effected with as favourable results as had happily attended that of Mr. Leigh Smith.

Mr. Clements Markham said that Captain Albert Markham regretted very much his inability to be present, as he was anxious to put a few questions to Mr. Leigh Smith. Most of them had, however, been anticipated in the paper.*

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* Captain Markham wrote as follows:—"H.M.S. *Vernon*, 11*th February*, 1883.—I am particularly anxious to know the exact condition of the ice in the immediate vicinity of the land during the winter months, whether navigable streams of water existed, and if so, in what direction they trended, whether parallel to the coast or otherwise? whether the pack was in motion throughout the winter, and in what direction was its general drift? was it a loose pack, or did it consist of extensive floes with level surfaces? what were the heights of the grounded floe bergs or hummocks? and was there a permanent ice-foot along the coast? if not, when did the land ice commence to form, and was it suitable for travelling on with sledges, or was it broken up into a mass of hummocks by the pressure of the pack?

"Was any rise and fall of the tide observed during the months that Leigh Smith and his party were on shore? if so, it would be interesting to know what it was, and also in which direction the tide ebbed and flowed.

"Was the fall of snow during the winter excessive? and what thickness of ice was formed between October and May? It would be important also to know what date the thaw commenced, and if the snow in the valleys or on the sides of the hills possessing a southern aspect was melted before the party left Franz-Josef Land. Were gales of wind experienced during the winter months? if so, from what quarter were the most prevalent and the most tempestuous? What wind brought the finest weather?

"Were they much pestered with fogs? All details connected with the wintering in Franz-Josef Land will be most interesting, however trivial they may appear to be! I hear the men took but little exercise during the winter, in fact remained in their beds the greater part of the time! Is this the case? for it was said by some that the outbreak of scurvy in our expedition in 1875 was in a great measure due to the insufficient exercise taken by our men, yet they were compelled to take exercise for two and some-

In the letter he had written he had also referred to the Americans now passing their second winter in Discovery Bay. He said:—"It is difficult to speculate as to their present position; whether they passed the winter in their own house, or whether they deserted it last summer with the idea of travelling south in order to meet the relief ship which we know was unable to reach them. In any case their position now is an unenviable one, but in the latter case it would be critical in the extreme, for they would not have been able to carry with them sufficient provision to last the winter, although they would of course make use of the few depôts left by us along the coast. It is to be hoped that musk-oxen and reindeer will be found; we found traces of these animals on our way up Smith Sound, but did not see the animals themselves south of Lady Franklin Strait. I sincerely hope the Society will consider the question of sending a ship up this summer, to look further. The Americans of course will send; but their relief expedition ought to be supplemented by one from this country. We owe it to them for the liberal way in which they assisted us in our search for Sir John Franklin; and we owe it also to ourselves as a great maritime nation which has ever taken the lead in Arctic exploration. Besides, we have officers possessing a greater knowledge of the navigation of Smith Sound than those of any other country."

The PRESIDENT, in moving a vote of thanks to Mr. Leigh Smith and Dr. Neale, said he was glad to hear Sir George Nares dilate upon a subject which the commander of the expedition could himself hardly have mentioned, namely, the singular force of character that Mr. Leigh Smith must have possessed to have kept his men in a state of perfect discipline, order, and good humour during such a trying time. It frequently happened that such was the strength of the gales and the violence of the snowstorms, that they were confined to the hut for eight days together; yet there was no murmuring, no impatience, no approach to indiscipline. So successful were the wintering and escape, and so fortunate was the relief, that many persons were apt to overlook the very great dangers that might easily have befallen the expedition. If, as Sir George Nares had said, the vessel had been nipped at the most northern point it had reached, the probability was that not one of the crew would have been alive at the present moment. The boat journey, too, when twenty-five men were confined to four boats for seven weeks, and underwent the immense toil of continually dragging the boats over ice, with all the inconveniences of the Polar regions, bordered on the miraculous. Had Sir Allen Young not been detained by his accident he certainly would have taken his course up along the northern coast of Novaya Zemlya, and so would have missed Mr. Leigh Smith's party, when a similar misfortune to that which befell the *Eira* might have befallen the *Hope*, and

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times five hours every day! Did no scorbutic symptoms of any kind appear amongst the *Eira's* crew, either during their residence in Franz-Josef Land, or after their return to England? I should like to know particularly if they ever complained of pains in their bones similar to rheumatic pains? Were their joints observed to swell? or did their gums get sore? It would be interesting to know the exact routine observed during the winter, and all details connected with the ventilation of their house, and other sanitary arrangements.

"After their departure from winter quarters I am curious to know in what direction the pack drifted when the boats were beset, before open water in the Barents Sea was reached? Was the drift effected by the wind, and how was its course determined? by astronomical observations, I presume.

"Beyond the portion of an antler which I hear was picked up, were any other traces or signs of the existence of reindeer on Franz-Josef Land observed? A list of all specimens of animal life seen in the neighbourhood of their winter quarters would be very interesting, and highly important to future explorers."

an adventure which had ended so happily might have closed in disaster. However, "All's well that ends well." He had listened with the greatest gratification to Mr. Sellar's observations on behalf of Mr. Leigh Smith's family. He need not say that the Geographical Society thought it their duty to do their utmost to promote a relief expedition on behalf of one who had been recently decorated with one of their medals, and who had shown himself so eager for the extension of our scientific knowledge of the northern seas. It was a great pleasure to hear the account of dangers so bravely encountered, so successfully overcome, and to congratulate Mr. Leigh Smith and his friends on the happy termination of such a dangerous expedition. He wished to make one remark on the evidence that had been afforded of the friendly brotherhood which existed among Arctic voyagers of all nations. They had heard of the assistance given by the crew of the *Willem Barents* to Sir Allen Young, and that was only one of innumerable instances of the way in which those engaged in similar adventures were ready to hold out the hand of good fellowship to each other, and to assist one another in cases of peril and necessity. He was sure they must all regret the absence of Mr. Leigh Smith, and that they had not been able to give him a personal welcome.

GEOGRAPHICAL NOTES.

The Mount Kenia and Victoria Nyanza Expedition. — A telegram has been received from Colonel Miles of Zanzibar, announcing that Mr. Joseph Thomson started for the interior from Mombasa on the 10th of March—"All well and prospects good."

New Expedition to the East of Lake Nyassa.—Our enterprising associate Mr. H. E. O'Neill is about to undertake another long journey of exploration into the unexplored regions between Mozambique and Lake Nyassa. His chief objects will be to examine the eastern and northern shores of Lake Shirwa, and to reach the rumoured snow-capped mountain a little further to the north-east. The Society assists Mr. O'Neill with a grant of 200*l.* towards the expenses of his expedition.

Portuguese Boundaries in the Congo Region.—An African Committee of the Lisbon Geographical Society, under the Presidency of the Vicomte de San Januario, and consisting (among others) of such authorities as Señores Barbosa du Bocage, Luciano Cordeiro, Serpa Pinto, Capello, and Ivens, has recently published, both in Portuguese and French, a Memorandum on the Rights of Portugal as regards the question of the Congo. In this Memorandum, the origin and continuity not only of the right of Portugal, but of her exercise of sovereignty over the Congo and the territories to the north of it are categorically stated, and considered to be demonstrated in accordance with the requirements of international law, both by discovery, possession, and recognition (with various subsidiary circumstances, repetition or analysis of which is not appropriate here, they being purely political). The result is an assertion of Portuguese authority on the coast-line north-

wards from the Congo without interruption to the territory of Molembo inclusively, accompanied by a decided opinion that it could be claimed for a much greater distance in that direction, the actual line of demarcation being in general terms considered as determined by the parallel of 5° 12′ S. lat., or by the river Luango-Luce (Cacongo), which to some extent includes the territory claimed. This territory is prefatially referred to as that part of the Portuguese province of Angola which comprises the ancient kingdom of Congo, crossed by the Congo river and politically bounded on the sea-coast by the parallel above referred to. The interior line of demarcation towards the Upper Congo is stated to remain undetermined and to be dependent on the needs and future resolutions of the Portuguese administration and colonial policy, there being no necessity as yet for greater precision, because no immediate territorial rights by any civilised nation have been recognised either on the coast or in the interior. The whole of the lower course of the Congo is considered indubitably to be included in this province, which, as it extends eastwards as far as the region of Jacca and Lunda, also includes a part of the upper waters of that river. The frontier line here is stated to be only capable of definition by future treaties with native chiefs or by their submission to Portuguese sovereignty, since there are no territorial rights possessed by civilised Powers towards the east.

In discussing the point of discovery, apart from generalities, chief reliance is placed on the voyages south of the Equator by Portuguese in 1464, including the discovery of the Cape of Santa Catharina on 1° 52′ S. lat. by João de Sequeira; the successful grant in 1469 to Fernão Gomes of rights of commercial exploration south of Sierra Leone, and the voyage of Soeiro da Costa and Pedro de Cintra in 1462 as far south as 6° 19′ 15″ N. lat.; the naming of the modern Cape Lopez in 0° 36′ 10″ S. lat. by Lopo Gonsalves in 1469, and of the Costa river or Great Bassom by Soeiro da Costa in 1470, during which year and the next João de Santarem and Pedro d'Escobar completed the exploration of the Mina coast, and commenced that of Benim, which, with that of Calabar, was so successfully terminated in 1486 by João Affonso d'Aveiro; the discoveries of the river Fernão Vaz (1° 51′ S. lat.) and Pedro Dias (now Sesta, Sette or Setté, 2° 22′ 30″ S. lat.), Point Fernão Gomes, Rasa, or Das Pedras, corrupted to Piedras (2° 42′ S. lat.), Cape Primeiro or Yumba (3° 15′ S. lat.), the roadstead of Alvaro Martins (3° 22′ 30″ S. lat.), Cape Segundo or Point Banda (3° 55′ 30″), the Bight of l'Indio or Bay of Kilongo (4° 16′ 30″ S. lat.), the Gulf of Judeu or Bay of Loango, and the gulf of the Almadias or Bay of Cabinda—all of which, palpably of Portuguese origin like many others, were the very first names on the most ancient charts, attesting the priority and continuity of original exploration in these then unknown regions; the actual entry of the Congo by Diogo Cam, in pursuance of a royal edict issued in 1484, and the erection by him, in 1486, of three commemorative

monuments: one at Ponta do Padrão, destroyed by the Dutch in the seventeenth century, and restored by the Portuguese Government in 1858, the second at Cape Santa Maria (13° 27′ 15″ S. lat.), and the third at Cape Negro (15° 40′ 30″ S. lat.); and the doubling of the Cape of Good Hope, with prior discovery of all the rest of the West Coast, by Bartholomeu Dias de Novaes in 1487.

Besides these discoveries on the coast, especial reference is made to the elaborate official instructions given in 1520 to Manoel Pacheco and Balthasar de Castro, who were sent for the purpose of studying the kingdom of Angola and the territories between it and the Cape; the first European relations established by Diogo Cam during his two voyages to the Congo with the King of Sonho, and continued with the powerful Muene Congo, or Manicongo; and the landing in 1491, in the roadstead of Santo Antonio or Sonho, of a numerous Portuguese colonising expedition sent by the Government under Ruy de Sousa, which was well received by the natives and entertained by the Muene Congo at his capital, now San Salvador. This last expedition is taken as the commencement of Portuguese exploration in Equatorial Africa, continued without interruption to this day, and of which the earlier attempts are briefly recapitulated, with incidental reference to corroborating evidence afforded by maps. Particular stress is laid upon De Sousa's expedition, as a Portuguese detachment took part in a campaign which the King of Congo, Nguiga-o-cuúm (converted and baptised as Dom João), undertook shortly after its arrival against certain revolted tribes of the Upper Congo, which are now identified as the Makoko of Stanley Pool.

Dr. Holub's Projected African Expedition.—We hear from Dr. Emil Holub that he intends to start again for South Africa, from Hamburg, at the end of May next, before which he will revisit England. He is now finishing his studies at the Royal Military Geographical Institute of Vienna, where he has been for some time engaged in acquiring a practical knowledge of scientific observations. The programme, of which he sends an outline, includes astronomical, topographical and hypsometrical work on a comprehensive scale, as well as those zoological, botanical, and geological subjects for which his former experiences have fitted him.

Stations of the French Jesuit Mission in South Equatorial Africa.—The powerful body of French Jesuits are silently spreading themselves over the whole Zambesi valley, settling in all localities which afford promise of success. The insalubrity of the climate seems to exercise no deterring influence; nine members succumbed in the three years 1880–2, but others quickly arrive to supply their place. The stations founded by them are at present eight in number, viz. Gubuluwayo (capital of Matabele-land); Penda-ma-tenka (the great trading mart, south of the

river); Tati gold-fields; Shesheke, on the Upper Zambesi; Moemba arabue; Tete; Mopea, near the mouth of the Shire; and Quillimane.

Nordenskiöld's proposed Greenland Expedition.—Mr. Oscar Dickson has made a visit to Copenhagen with the object of making preliminary arrangements with the Danish Government in connection with the proposed Swedish Expedition. He was very well received by the King, who has sanctioned the expedition, and met also with a flattering reception at a meeting of the Danish Geographical Society, where he explained the objects of the undertaking. In his speech he gave prominence to the historic interest of Greenland, and its original colonisation by Icelanders as related in the old chronicles, and the tragic disappearance of the early Danish colonies and invasion of the country by American Esquimaux. Thus Greenland had become almost forgotten until the rediscovery of its western coast, which both geographically and ethnographically was the best known of all Polar countries. Such, however, was not the case with the south-east coast, of which only a small portion of its southern side was yet known. The interior of Greenland was still a *terra incognita*, and formed an immense stretch of land well worth investigation. Owing to the researches made by Nordenskiöld and Lieutenant Jansen, it could hardly be thought that the whole interior of the island was covered with ice; and this view was borne out by its known geographical formation, and from the fact that the temperature and the moisture of the atmosphere afforded strong proof that the interior of the island gave birth to its name. The expedition, he said, intended giving attention to many branches of scientific research; among others, to determining the direction of the ice-drift between Iceland and Cape Farewell; an examination of the ice-fields, the fossil vegetation, &c. While Nordenskiöld prosecuted his researches inland, another portion of the expedition would examine parts of the west coast where it was known that curious blocks of iron existed. The expedition would be accompanied by a staff of specialists. Another object of the expedition would be to discover the site of "Osterbygden" (East colony), and having studied the earliest chronicles of this interesting settlement, he could hardly fail to believe that traces of it would be found on the east coast. The expedition would sail in May on a well-equipped steamer, and if the condition of the ice was favourable, would proceed direct to the east coast. If, however, such was not the case, it would first disembark on the west coast, after which an attempt would be made from Cape Farewell to proceed along the east coast, if a channel between it and the ice could be found. It was intended that the expedition should return to Europe in November.

Russian Polar Meteorological Station at the Mouth of the Lena.—The party of scientific observers and their assistants, who were appointed to establish the Russian polar station in the Lena delta, embarked at

Yakutsk in four boats to descend the river on the 20th of June last, and arrived at their destination, Sagastyr Island, on the 10th of August. The last news of them was brought by two United States officers, Messrs. Schutze and Harber, who had been engaged in the search for possible survivors of the *Jeannette* Expedition. They left the Russian party in the middle of October, all well and comfortably housed for the winter. In addition to the three scientific observers, there were two members of the signal corps and seventeen Yakut workmen. Lieutenant Jurgens, the head of the station, had determined its position by astronomical observation as N. lat. 73° 22′ 30″ and E. long. 126° 34′ 55″. The party are well furnished with provisions, including two live cows and a calf, and have a supply of petroleum for light and fuel. The warm and comfortable dwelling-house, as well as the separate observatories, communicating by covered passages, were constructed in sections at Yakutsk, and can be put together or taken to pieces with ease and rapidity. A good collection of books and various games for evening amusements have also been provided, and a service of monthly posts between the station and Yakutsk arranged.

Lessar's Journey from Askabad to Herat.—We learn that an account of M. Lessar's recent journey of exploration from Askabad to the neighbourhood of Herat will shortly be published in the French language at St. Petersburg. It is said that it is the opinion of this enterprising engineer that the Oxus can be diverted into its old bed to the Caspian.

Obituary.

William Desborough Cooley.—This eminent geographical writer and critic died, at a good old age, on the 1st of March last. For a series of years he took a prominent part in discussing, in literary and scientific journals and in pamphlets, disputed questions of Central African geography, at a time when practical discovery marched too slowly for the impatience of a certain section of the public, and hypothesis was invoked to piece together our imperfect and disjointed topographical knowledge. In these discussions Mr. Cooley distinguished himself by the vigour of his style of writing and his mastership of the literature of African geography. He was also a good linguist, and had perfected his acquaintance with Ki-Swahili, the *lingua franca* of Eastern Africa, by taking lessons of an intelligent native of Zanzibar whom accident had brought to the port of London. It was probably to the same authority, if not to theoretical considerations solely, that he owed the fixed idea which was the foundation of much of his bitter opposition to other geographers and travellers, that the Central African lakes formed one extensive inland sea. It must be allowed, however, that his writings contributed in no small degree to keep alive public attention to African geography, and to a certain extent led the way to the great discoveries of the last quarter of a century.

The chief works which emanated from his industrious pen were, 1. 'History of Maritime and Inland Discovery,' 3 vols., 1830; translated into French in 1840;

2. 'Negroland of the Arabs examined and explained,' 1841; 3. 'Inner Africa laid open,' 1852; 4. 'Claudius Ptolemy and the Nile,' 1854; 5. 'Dr. Livingstones Reise vom Fluss Liambey nach Loanda in 1853–4, kritisch und kommentarisch beleuchtet,' 1855; 6. 'Memoir of the Lake Regions of East Africa reviewed,' 1854; 7. 'Dr. Livingstone's Errors,' 1865; 8. 'Dr. Livingstone and the Royal Geographical Society,' 1874; 9. 'Physical Geography, or the Terraqueous Globe and its Phenomena,' 1876. Besides which were the following memoirs contributed to the pages of our Journal; 1. On the Civilisation of the Tribes inhabiting the Highlands near Delagoa Bay, vol. 3 (1833); 2. The Geography of N'yassi, or the Great Lake of Southern Africa, investigated, vol. 15 (1845); 3. Further Explanations in reference to the Geography of N'yassi, vol. 16 (1846); 4. On the *Regio Cinnamonifera* of the Ancients, vol. 19 (1849); 5. Notes of a Caravan Journey from the East to the West coast of Africa, vol. 24 (1854). Among his minor works may be mentioned a long series of controversial articles on African subjects, contributed to the *Athenæum*, a translation in two vols. of Erman's 'Reise um die Erde,' and an article in the *Foreign Quarterly Review* in the year 1832, exposing the fictitious nature of Douville's 'Voyage au Congo et dans l'Intérieur de l'Afrique équinoxiale,' published in three volumes, in the same year, at Paris.

Notwithstanding his learning, unwearied industry, trenchant and vigorous style, and the amount of information contained in his various writings, it is doubtful whether Cooley's literary reputation will long survive him. An exception may perhaps be claimed for his 'Physical Geography,' a thoroughly original work which has not yet met with the attention it deserves; but his other productions were tinctured too conspicuously with obstinate prejudice to be pleasant reading or to aid students in their search after truth. In fact Geographical Discovery, during the author's own lifetime, demonstrated the fallacy of the opinions he propounded with so much vehemence, especially his denial of the existence of snow-capped mountains in Equatorial Africa, the discovery of which by Rebmann and Krapf he disbelieved and ridiculed, his separation of the Zambesi into two distinct river basins, and disconnection of Lakes Tanganyika and Nyassa. The two latter hypotheses were reiterated and eloquently argued out in his paper read at one of our meetings so late as October 1864, when they were confuted in the discussion which followed by travellers in the same regions, Captain Speke, Dr. Kirk, and others; the paper was published only in abstract in vol. viii. of the old series of the 'Proceedings.' He never, in fact, admitted his errors, and in private conversation to the last was just as strongly opposed to Krapf, Livingstone, and others as he was a generation ago. His affliction of deafness, and the social isolation which it entailed, seem to have intensified the peculiarities of his temperament, but he was a true lover of Geography and the kindred sciences, and on this account merits a kindly word in these pages. He had been a Fellow of our Society since 1830, and was made an Honorary Free Member in 1864. In his connection with us he was always ready to be of service, and two or three years ago, when disposing of his library, made us the generous gift of such of his books as were wanting to our collection, the Librarian making the selection, which amounted to 60 volumes of valuable geographical works. He had lived for many years quite alone, in humble London lodgings, supported during his later years almost solely by the civil list pension of 100*l.* granted him in 1859.

REPORT OF THE EVENING MEETINGS, SESSION 1882–3.

Seventh Meeting, 26*th February*, 1883.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*John Anderson, Esq.; Charles Albert Barber, Esq.; His Grace the Duke of Buckingham and Chandos; Bertram Buxton, Esq.; Herbert Druce, Esq.; John Duncuft, Esq.; Arthur Howard Frere, Esq.; Francis Mathew, Esq.; Charles W. Mills, Esq.; Thomas B. Muggeridge, Esq.; Frederick Sharp, Esq.; Frederick Tooth, Esq.*

A paper was read by Mr. R. B. White, C.E., F.G.S., "On the Central Provinces of Colombia." It will be published, with discussion and map, in the May number of the 'Proceedings.'

Projected Swedish and Danish Expeditions to Greenland.

On the termination of the discussion which followed Mr. White's paper:

Mr. Clements Markham read a letter from Her Majesty's Minister at Stockholm, relating to an expedition which Professor Nordenskiöld was about to lead to Greenland next summer (*vide* 'Proceedings,' *ante*, March number, p. 165): also the following letter from Admiral Irminger, of Copenhagen, announcing a Danish Expedition to the same country:

"Copenhagen, *February* 23*rd*, 1883.

"In the month of May this year, an expedition equipped by our Government, will leave Copenhagen for Greenland. This expedition will be commanded by Lieutenant Holm of the Danish Navy. Lieutenant Holm has already made three expeditions to Greenland, and he will be joined by a younger lieutenant of the navy, Mr. Garde, and two scientific men, representing geology and botany. The expedition will proceed from South Greenland, in Greenland boats, followed by Greenlanders, round Cape Farewell, and continue north along the east coast. This is the same route that Captain Graah took; but the present expedition will do their utmost to penetrate to the interior, which, as you know, Captain Graah had no time to do. It is determined that the expedition will take at least two years."

The President said these communications held out a rich promise of interesting discoveries. The name of Greenland seemed a strange one as associated with a country of perennial ice. It was a moot question whether, as Professor Nordenskiöld believed, the interior consisted of fresh pastures, or whether, in former days, speculators gave the country such a name in order to attract colonists to that inhospitable region. The question might be cleared up by Professor Nordenskiöld. There was another subject of the greatest possible interest on which some light might be thrown. Reference had often been made to the invasion by ice and snow of many of the valleys of Greenland which were once peopled by thriving and tolerably prosperous communities. Beyond all question many of the valleys to the north which were once occupied by settlers from Iceland and Norway, had been gradually filled with ice. The subject had not attracted as much attention as it might have been supposed its importance to the future destinies of Europe would naturally attract; and one interesting result of the joint visits of the expeditions from Denmark and Sweden, would undoubtedly be to throw some light upon it.

Eighth Meeting, 12*th March*, 1883.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*Thomas Parry, Esq.; William Petersen, Esq.; Russell Shaw, Esq.; Rev. Theed John Watson*, M.A.

The following paper was read:—

"Mousketof's Explorations of the Zarafshan Glacier." By E. Delmar Morgan.

The paper forms a part only of a larger memoir on Recent Russian Explorations in the mountainous region of Eastern Bokhara, which will shortly be published, with map, in the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—March 2nd, 1883: M. Antoine d'Abbadie, (of the Institute) President of the Central Commission, in the Chair.—Dr. Hamy, Vice-President of the Central Commission, addressed some words of welcome to M. d'Abbadie on his return from the mission with which he was charged by the Academy of Sciences, viz. to make observations upon the transit of Venus. More fortunate than many of his colleagues, M. d'Abbadie was favoured on that day by the weather, and science will certainly profit by this happy circumstance.—The General Secretary called the attention of the Society to the photographs exhibited in the hall, which had been sent by Mr. Leigh Smith, the daring explorer of the Polar Regions, the photographs representing the regions traversed by the traveller.—The Geographical Service of the Army (through the War Minister) transmitted the first part, in six sheets, of the map of Africa, scale 1: 2,000,000, published by that service; it will comprise sixty sheets. An explanatory account accompanies it.—The Minister of Published Works sent the fourth part of the map of France, scale 1: 200,000, published by this administration. The number of sheets which have already appeared is twenty-five out of the 125 which the complete map will contain. Accompanying this is a map of the Department of the Lower Seine on the same scale. —A map of Africa was submitted to the Society by M. Brau de St. Pol Lias, which, according to statements made to him, belonged to Livingstone during his first journey. The celebrated traveller had given it to a man named Juan d'Acosta Suarez, with whom he had lodged, and of whom he speaks in his account. Should the authenticity of this document be confirmed, it will be a valuable geographical relic to be added to the Society's collections.—The Meuse Section of the Geographical Society of the East (Nancy), the section which sits at Bar-le-Duc, sent the programme of the Geographical and Ethnographical Exhibition to be held in that town from the 20th August to the 20th September, 1883.—M. Ferdinand de Lesseps, President of the Society, announced that he was going to be absent for a month. He is proceeding to Africa to Commander Roudaire, who has been there for two months in connection with the works of this "inland sea," about which so much has been said recently. M. de Lesseps will start with a number of engineers who are going to make their report as to the possibility of executing this scheme. Commander Roudaire does not now solicit the assistance of the government; it will be a purely private enterprise. In conclusion, M. de Lesseps read a letter favouring the enterprise which had been written by Abdel Kader to the military and religious chiefs of the provinces of Tunis and Algeria, through which the explorers will have to pass; this letter is

inserted in the Journal of the Suez Canal Company.* A letter from Dr. Bayol, who is charged with a mission to Senegal, gave occasion to M. de Lesseps to make some further remarks. He (M. de Lesseps) dwelt upon the two important events which have just taken place in that colony; first, the passage of the first train over the portion of railroad which has just been opened in Senegal; secondly, the arrival of Colonel Borgnis-Desbordes upon the middle Niger, where the French flag is definitely set up. The practical consequences of these two events do not concern the Society, which only sees in them the opening of a new epoch for African studies. M. de Lesseps reminded the Society of the names and works of French travellers who have contributed to this result, viz. MM. Réné Caillié, Mage, the Gallieni and Derrien Missions, without forgetting the late Governor of Senegal, General Faidherbe.—M. Lequès wrote from Noumea (New Caledonia) on the 21st December, 1882, announcing his approaching return to Paris. He is bringing with him some interesting collections; a topographical map and also a mineralogical map of New Caledonia, notes on that colony as well as upon Australia, Tasmania, and New Zealand, to supplement all the Geographical Dictionaries in use; lastly, a collection of vocabularies containing all the idioms of New Caledonia, the Loyalty Islands, and the New Hebrides, apart from information on the mythology of the natives, collections of their romances, and of their songs, &c. He will no longer be prevented from bringing to Paris a group of twelve Canaques, men and women. This project will be communicated to M. Geoffroy de St. Hilaire, director of the "Jardin d'Acclimatation," at Paris.—M. Dutreuil de Rhins gave an account of the recent exploration of Tibet by a pundit. He also commented on the article published on this subject in the 'Proceedings of the Royal Geographical Society,' and insisted principally on the part which concerns the interesting problem of the junction of the great rivers of Tibet, China, and Indo-China. The solution of the question of the Sanpo is exactly what M. D. de Rhins had foreseen: the river Sanpo is not the upper course of the Irawadi, but properly that of the Brahmaputra. He showed what are the other important results of this exploration, and especially the light which it has thrown on the most unknown part of Tibet, viz. that quadrilateral, twice as large as France, lying between Lhassa and Ta-tsien-lu on the south, and the 40th parallel on the north. M. D. de Rhins had the route taken by the Anglo-Indian traveller described on the blackboard for the benefit of the audience.—M. Caspari, hydrographical engineer of the Navy, presented several maps, accompanied by a description of the coasts of Anam. These maps concern that part of the coast which extends from Cape Padaran to the island of Hon-tsen in the Gulf of Tongking, or from 11° to 18° lat. N. The surveys have been made (from 1877-9) by M. Caspari, with the assistance, from the commencement of 1878, of M. Renand, another hydrographical engineer. The maps are published by the Map and Plan Depôt of the Minister of the Navy. One of the two pamphlets presented by M. Caspari, and accompanying the maps, is a nautical description of the coast, the other is an account of the determining of some geographical positions, which have been ascertained directly by astronomical observations; they comprise outside the part surveyed, the coasts of French Cochin China, the Gulf of Siam, the island of Pulocondora and the town of Bangkok. Among the interesting results obtained for geography, in addition to the fixed positions and nautical information above-mentioned, the engineer gives the following: the rectification of the maps of Dayot and of *La Favorite*, the fact that the magnificent harbours of Binh Kang and Xuanday are liable to the encroachments of an advancing sandbank, at least in their more shallow parts, the determining of the principal summits of the coast

* See 'Le Canal de Suez,' of March 2nd, 1883.

range, some of which have an altitude of 6500 feet or more. Considering the small importance of the rivers which debouch on the coast, it is probable that the mountain chains determined form the separating line of the waters of the Mekong, which, according to the ancient maps, will have to be traced back especially towards the east, and cause the enlargement of the basin of this great river.—A letter was read from the French consul at Chicago, relative to the explorations made in August last by General Sheridan, commander of the military division of the Missouri, in the districts, still so little known, under his command, viz. those situated on the borders of the three states of Wyoming, Montana, and Idaho. The General's printed report accompanies the letter, as well as a map published in 1881, under the title of "Yellowstone National Park, Big Horn Mountains, &c.," on which the General has traced an outline of his expedition. The countries traversed by M. Sheridan are, it appears, of incomparable beauty; they will shortly be made accessible to tourists, thanks to the establishment of a railway and other necessary installations.—In conclusion a lecture was given by M. Edmond Fuchs, chief mining engineer, on the geological mission which he has just accomplished in Indo-China (Cochin China, Anam, Tongking, Cambodia). The lecturer commenced with a rapid description of the journey completed by him in company with a coadjutor, M. Saladin, mining engineer. He (M. Fuchs) was struck with the contrast between the peoples of Aden, the Red Sea, &c., and those of Ceylon, the Indies, and Singapore; the former are rebellious to all external influences, while the latter, who are agriculturists and not shepherds, lend themselves much more readily to the influences of civilisation. He then described at great length the geography and orography of Indo-China, pointing out that the inhabitants are concentrated chiefly in the three great valleys of the Yellow River, the Mekong, and the Menam, whose estuaries are growing with astonishing rapidity. After having made some observations indicating the age of Lower Cochin China, the formation of which does not date back much before the Christian era, M. Fuchs sketched, from an ethnographical point of view, the two great races of Indo-China, viz. the Malays and the Chinese. He then passed to the geology of the peninsula, and insisted on the great preponderance there of carboniferous formations. He concluded by remarking upon the coal and auriferous basins of Tongking, which he has visited, and expressed the hope that it would soon be possible for these natural riches to be utilised.

——— March 16th, 1883: M. Antoine d'Abbadie (of the Institute) in the Chair. —The Minister of Public Instruction wrote that, in accordance with the expressed desire of the Society, he had decided that a geographical section should be formed, and that it should be present at the congress of the learned societies, which is held annually about Easter-time at Sorbonne. In consequence of this decision, a circular had been sent to all the Presidents of the French Geographical Societies summoning them to the meeting of the learned societies, which is to take place in the course of a few days. At the same time measures are being taken by the Minister to ensure the working of the new section.—The Committee charged, at Frankfort-on-the-Main, with the organisation of the Third Congress of German Geographers, which is to be held in that town on the 29th, 30th, and 31st of this month, transmitted the programme of the intended operations of this assembly. A Geographical Exhibition, which will remain open till the 8th April, is annexed to the congress; and strangers will be admitted to it on payment of a small fee. The first speaker will be Lieutenant Wissmann, who will lecture on his recent journey across the continent of Africa.—M. Ledoulx, French Consul at Zanzibar, in a letter dated January 3rd, 1883, states that he had seen Lieutenant Wissmann on his departure from Africa and had held conversation with him. The traveller compared a great part of the

district he traversed to the best-watered and most fertile countries of Europe. He spoke very highly of the hospitality which he had generally received. He has sketched a portrait of the king Mirambo, which is not quite in accordance with the ideas formed concerning this monarch. The French consul also gives news of M. V. Giraud, midshipman, who, having completed his preparations, has at last been able to start, on the 10th December, 1882, from Dar-es-Salaam. This traveller fortunately has not encountered the difficulties against which Captain Cambier, of the Belgian Committee of the International African Association, had to struggle. He (Captain Cambier) had only been able to recruit 250 men out of the 400 which he should have conveyed to the Congo. M. Ledoulx seems to think that this recruiting will become increasingly difficult in the future. M. Giraud will direct his course in the first instance to Lake Bangweolo, following, by preference, the route recently taken by Mr. Thomson; this route traverses Usagara, and just terminates between the Lakes Nyassa and Tanganyika. After having surveyed the course of the Chambeze, which he will be able to do thanks to a portable folding canoe he has taken with him, he will proceed to Lake Moero, whence he will endeavour to reach the Congo by whatever route he may find most practicable. A letter from him, dated December 24th, is already to hand, from which it appears that his journey was favourably commenced. From the consul's letter, we learn further that Père Etienne, Superior of the Zanzibar Missions, started from Bagamoyo on the 27th of November last, to proceed into Uzegua and there to establish a new station between M'rogoro and Mahala; that the consul had been on a French despatch-boat to be present at his departure, and to visit at the same time the farming operations of the mission at Bagamoyo; on his return, Père Etienne intended to visit Oudoua, and devise means for founding an establishment at Rizaho, which would connect Mandera with Bagamoyo, and be situated in the midst of a tribe of cannibals, about whom there had been some question in the former letters of M. Ledoulx.—The managing committee of the Geographical reunions organised by Paris merchants transmitted the report of the first of these meetings, when a paper was read by M. Millot, companion of M. Jean Dupuis, who explored the Red River of Tongking.—It was announced that a communication had been received from General Bovet on Cambodia *à propos* of a work by M. Moura, late representative of the French Protectorate in that country. Also one from M. J. Fieux, civil engineer at Bordeaux, on the geology of the basin of the Faleme, and of a part of the Upper Senegal.—Captain Lagarde sent a manuscript map of the circle of Laghouat (Algeria) together with a corroborative note.—General Venukoff informed the Society of the departure for China of M. Potanin, who is already known by his travels in North Mongolia. Also that M. Prejevalsky will certainly go to Tibet, and under excellent conditions, for he will have an escort of 15 Cossacks and a subsidy of (120,000 francs) 4800*l*. That the meteorological observations at the station on the river Lena commenced in August 1882, but that there had been some delay in the magnetical observations owing to some unexpected accidents with the instruments. M. Venukoff also announced the publication of an important work on fishery in the Boreal ocean on the north of the White Sea. The fishery is much more plentiful than that caused by the south-west wind on the western coast of Scandinavia. He stated moreover, that a new Chinese town had been built in Dzungaria, viz. the town of Dorboid. It has been fortified according to the principles of modern art, and the Chinese intend to make it an important market. This town, which was formerly only a miserable village, is built near the Russian frontier (Valley of Emile). M. Venukoff then added, *vivâ voce*, some very curious information, which he had just received during the meeting, on the relations between Corea and Japan. At the beginning of January of the present year, the Corean port of Ninsen (western coast of Corea) was opened to the Japanese, who

immediately established there a commercial colony, and regular communications have been made by the Japanese Steam Navigation Company, "Mitsu-bichi." To recognise this service, the Japanese Government has sent to the King of Corea 425 Martini rifles, together with 50,000 cartridges, and in addition the right to purchase arms and ammunition in Japanese arsenals. This present of arms was accompanied by 12 sets of telegraphic apparatus, and several telephones made in Japan itself.

Geographical Society of Munich.—November 9th, 1882.—Herr Richard Buchta gave a lecture on his recent travels in the region of the Upper Nile, entitled "The Nile and Egypt," dividing his subject in two parts, 1, the course of the Nile from the Victoria Nyanza to the Mediterranean, and 2, the Copts.

——— November 23rd.—Captain Förster read a paper on recent events on the Congo, and the rivalry between Stanley and De Brazza.

——— December 9th.—Dr. Max Buchner, the West African traveller, delivered a *vivâ voce* address on the manners and customs of the negroes of the Bantu race, describing their state of civilisation, their mental and physical characteristics, &c.

——— December 21st.—Dr. Penck read a paper "On the Sea-level." He explained that the accurate measurements of an arc of a meridian which had been successfully carried out on various parts of the earth's surface had proved that the curvature of surface of our planet was very diverse; it was so on the land surface, and therefore was the same on the sea. Further, that pendulum observations led to the conclusion that the globe was not an ellipsoid of revolution. It results in fact from the law of gravitation that in consequence of the deviation of the plumb line owing to the extremely unequal division of the earth's surface into land and water the sea-level cannot have the mathematical surface of an ellipsoid of rotation, but a surface of its own special kind—a geoïd.—A discussion ensued on the reading of this paper, in which Professor Bauer and Professor Jolly, besides the author, took part. Professor Jolly especially pointed out that the distribution of matter in the interior of the earth would have a considerable influence on the sea-surface.

——— January 16th, 1883.—Herr Geistbeck read a paper on the temperature of the Bavarian lakes. After describing his methods of observation, he stated that the lakes of Bavaria were to be grouped according to the temperatures of their water in two classes, warm and cold. The warm lakes are the smaller and shallower waters; the cold group are the larger lakes, which, however, notwithstanding their low temperature did not freeze.

——— January 25th.—Major von Mechow, the eminent explorer of the southern tributaries of the Congo, delivered an address on his recent travels, having come from Berlin on the invitation of the Munich Society for the purpose. In his lecture he dwelt particularly on the great difficulties the traveller had to contend with in West Africa, difficulties which had prevented him from completing his project of exploring the upper course of the Congo. He had, however, surveyed a portion of the great southern tributaries, and he gave a vivid description of the falls of the Quango which he had visited.

——— February 8th.—Dr. Oscar Lenz, of Vienna, gave an account of his journey from Morocco to Timbuctu. In describing the Western Sahara through which he travelled, he said it was a waste of stone and sand, and he entered into some detail with regard to the causes of this aridity, which he maintained was comparatively recent, the former condition of the region having been one of much greater moisture. He attributed the desiccation to the felling of the forests on the Ahaggar mountain-range, which had had the effect of drying the springs of the rivers which had their origin in those mountains and flowed through the plains.

—— February 23rd.—The new Bureau for the year was elected, as follows:—*President*, Dr. von Jolly; *Vice-President*, Dr. Littlel: *Secretaries*, Dr. von Huller, Dr. Albrecht Penck; *Treasurer*, Herr von Nies; *Curator*, Dr. Moritz Wagner; *Librarian*, Captain B. Förster; *Council*, Dr. von Haubenschmid, Dr. von Giesebrecht, Dr. von Brinz, Dr. Bursian, Captain Ruith, Dr. F. von Liebig, Colonel von Orff, and Dr. Rohmeder.—Previous to the election, Dr. von Jolly gave the Meeting an account of the International Polar Stations which have been recently established, and spoke of their high scientific utility on the ground that the thermal and magnetic constants of the earth can only be gained by continuous and simultaneous observations, especially in high latitudes. The magnificent series of photographs of scenery and people of the lake regions of the Upper Nile, taken by Herr Buchta, were exhibited and explained to the Meeting.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Berlioux, E.-F.—Les Atlantes. Histoire de l'Atlantis et de l'Atlas primitif, ou Introduction à l'Histoire de l'Europe. Paris (Leroux): 1883, 8vo., pp. 170.

Prof. Berlioux's preliminary point is a correction of what he states to be the ordinarily received rendering of the name of the mythical Platonian continent, from "Atlantide" to "Atlantis," which is the nominative of the word employed by the Greek philosopher;—a correction only applicable from a French point of view, as the proper name "Atlantis" has always been in use by English writers. He then on historical, archæological, and geographical grounds, refers the name Atlantis to the region of the Atlas, diagnosed as being situated at the mouth of the Mediterranean, opposite Western Europe, on a direct prolongation of the Egyptian coast, at the head of the shortest route to the New World, and forming a sort of separate continent, placed on the limits of Europe and Africa, but really belonging to neither. This region is, as it were, an island comprised between the Mediterranean and the desert from north to south, and the Gulf of Cabes and Atlantic Ocean from east to west, and presenting an immense quadrilateral (a point which is, of course, familiar to students of physical geography, and is briefly put amongst others in the late Keith Johnston's 'Africa,' p. 17, in Stanford's Compendium). Comparing the text of the different ancient historians who record events or supposed myths bearing on this region, with the traces of identification afforded by enduring geographical names, Prof. Berlioux comes to the conclusion that sufficient proof remains for a reconstruction of the history of this new Atlantis, from the arrival of its first inhabitants to the Phœnician invasion, during which first epoch (and not that of the subsequent Tyrian and Carthaginian dynasties) he considers the culminating point of North-Western African power to have been reached. The primitive people he considers to have been Libyans, who originally came from Europe, and were joined by the Getulians (now Berbers) from the Sudan; and the development of their history is deemed even of more importance for a correct knowledge of early Europe than of Africa; for though the author does not dispute the Asiatic origin of all races of mankind, he is of opinion that too much stress has been laid upon linguistic tradition, and that the Aryan language (a term accepted by him as without geographical significance) was originally spoken by Europeans, not in a country like that of the Oxus, isolated in the interior of the Asiatic continent, but in a western region, washed by many seas. It is precisely from this cause, according to M. Berlioux, that the European languages have such varied expressions indicating marine basins.

Norway.—Rundt Norge fra Tistedalen til Jakobselven, efter Tegninger af Ludv. Skramstad o. fl. andre Kunstnere, med Tekst af Dr. Yngvar Nielsen. Kristiania (P. T. Malling): [n. d.] 4to., pp. 103, illustrations. (*Williams & Norgate*: price 12*s.*)

An excellent pictorial representation of the chief features of Norwegian physical geography, interspersed with a few views of buildings, &c.

ASIA.

Crow, Arthur H.—Highways and Byeways in Japan. The Experiences of two pedestrian tourists. London (Sampson Low & Co.): 1883, post 8vo., pp. xvi. & 307 [no index], maps, frontispiece. Price 8*s.* 6*d.*

Entirely in Central Japan, covering (apart from the usual ports) the road from Osaka by Lake Biwa to Nikko, returning to Tokio and ascending Fuji-San.

AMERICA.

Brocklehurst, Thomas Unett.—Mexico To-day: a country with a great future, and a glance at the prehistoric remains and antiquities of the Montezumas. London (J. Murray): 1883, 8vo., pp. xvi. & 259 [no index], map, coloured plates and illustrations. Price 21*s.*

Chiefly extracts from a journal kept during a residence of seven months in the capital, with a few notes of excursions to neighbouring cities and places of interest; including an account of the author's ascent of Popocatapetl, with a reprint from the *New York Herald* of another account by Ober, an American ornithologist. A general chapter on Mexico is given, and special attention paid to the antiquities, with various original drawings. The extremes of archæology and modern life are indeed the chief objects of the work, which contains little geographical matter. A map on a small scale shows the projected railroads, and sections are given of the whole republic and of the lakes in the valley of Mexico.

Hatton, Joseph and Harvey [Rev.] M.—Newfoundland: the oldest British Colony, its History, its present Condition, and its prospects in the future. London (Chapman & Hall): 1883, 8vo., pp. xxiv. and 489, illustrations. Price 18*s.*

Part II. is devoted to a compilation on the physical geography and topography, with discussion of the geology, climate, fauna, flora, and aborigines. The economical aspects of the geography of Newfoundland are also commented upon in Part IV., which treats of the agricultural resources of the island. Some of the illustrations deserve mention, being from photographs and sketches made expressly for the work.

Hellwald, Friedrich von.—America in Wort und Bild. Eine Schilderung der Vereinigten Staaten. Leipzig (Schmidt & Günther): 1883, 4to., illustrations. (*Williams & Norgate.*)

The commencement of a largely illustrated work to be completed in some 50 numbers at 1*s.* each, and for the publication of which the chief motive appears to be afforded by the intimate connection of Germany with the United States from an emigrational point of view.

ARCTIC.

Melville, Geo. W.—Report of Chief Engineer Geo. W. Melville in connection with the *Jeannette* Expedition. Washington (Government Printing Office): 1882, 8vo., pp. 19, map.

This is the official account of the movements of the whaleboat in command of Mr. Melville, with Messrs. Danenhower and Newcomb and a crew of seven, after separation from the late Lieut. G. W. De Long, and of the subsequent search for the missing members of the recent American Arctic Expedition, of which a preliminary notice was given in our 'Proceedings' for last May,

p. 289. The three boats containing the shipwrecked crew of the *Jeannette* left Simonoski Island (written "Simoutki" in the first account), some 90 miles N.E. of the Lena delta, on the 12th September, 1881, with the object of reaching Cape Barkin, but were separated by stress of weather on the very first day. On the 14th, Mr. Melville struck the coast, and worked along it eastward, until on the 16th he arrived at one of the eastern arms of the Lena delta, which he attempted to ascend, succeeding in meeting with natives on the 19th. Not being able to get pilots to Belun, the nearest Russian settlement, on the main stream of the Lena, and being much distressed by frost-bites and foul weather, a camp was made on the inhabited island of Jamavaeloch (or Jamavalach, about 72° N. lat., 130° E. long.), where the party remained, dependent on supplies from the natives, until on 16th October an exile named Koosma undertook to deliver despatches at the Russian post above referred to. He returned on the 29th, with a small supply of food, having on his way back met with two of the crew of the first cutter endeavouring to procure aid for De Long and his companions who were in a starving condition to the northwards (as it turned out, 133 miles distant). Mr. Melville at once started to intercept the Russian commandant who was following Koosma to succour his own party, in the hope of helping De Long, but unfortunately crossed him on the road in the mountains. Arrived at Belun, Mr. Melville, having seen to the security of his men, started as soon as possible (5th November), with two dog teams and two natives in search of his commander, travelling northwards down the main Lena bank, and arriving at North Belun on the Keeluch branch close to the mouth at midnight on November 11th. Here he found traces of De Long, and though single-handed, badly frozen, and put to the most extreme straits for want of provisions, heroically followed up every indication, travelling long distances in the severest weather, only to be compelled to return to Belun on November 27th, after an absence of 23 days, with the conviction that his late companions must have perished. Search for their remains not being possible until the following spring, he proceeded to Yakutsk, and having seen to the safe return of his own men, returned to Belun on February 17th, 1882. After some time spent in making the necessary arrangements and storing provisions, Mr. Melville on March 6th started once more northwards with Bartlett, one of his crew, and Ninderman, one of the survivors of De Long's party, and commenced a series of searches from Cass Carta (or Cath Carta, situate a little above the separation of the Keeluch and Osotok mouths of the Lena delta) until on March 23rd he found the dead bodies of De Long and two of his crew. By the 27th he had recovered all except two, and by April 7th had buried them at Kooboloh (or Koobalach).

An unsuccessful search for the remaining boat, the second cutter, commanded by Lieutenant Chipp, was then commenced and continued westward along the coast to the mouth of the Olenek, along the north coast, and eastward towards the Jana. Yakutsk was reached on June 8th, Irkutsk on July 5th, and New York on September 15th.

The different localities referred to are shown, with the various routes and incidental notes on distances, &c., on a map of the entire Lena delta appended to the Report, reaching to the mouth of the Olenek.

GENERAL.

Mohn, H.—Grundzüge der Meteorologie. Die Lehre von Wind und Wetter, nach den neuesten Forschungen gemeinfasslich dargestellt. Berlin (Reimer): 1883, 8vo., pp. xii. and 359, charts and woodcuts. (*Dulau*: price 6*s.*)

Originally published in 1875, with a second edition in 1879, Professor Mohn's treatise is now so firmly established as a text-book on the Continent, that a third edition has become necessary. This is increased by some 50 pages, and contains various additions bearing on the geographical aspects of meteorology, with many corrections in text and maps.

Studi Biografici e Bibliografici sulla Storia della Geografia in Italia, pubblicati in occasione del III° Congresso Geografico Internazionale. Volume I.

Biografia dei Viaggiatori Italiani colla Bibliografia delle loro Opere, per P. Amat di S. Filippo. Edizione Seconda. Roma: 1882, 8vo., pp. xi. and 743, maps. Volume II. Mappamondi, Carte Nautiche, Portolani ed altri Monumenti Cartografici specialmente Italiani dei Secoli xiii.—xvi., per G. Uzielli e P. Amat di S. Filippo. Edizione Seconda. Roma: 1882, 8vo., pp. xvi. and 327. Price 8*s.* each vol.

The first edition of this work was published (as one volume) at Rome, in 1875, by a ministerial deputation appointed under the auspices of the Italian Geographical Society, as a contribution to the second International Geographical Congress in Paris, illustrating Italian work. An opportunity of correcting and adding to this necessarily hurried preliminary sketch was afforded by the third congress in 1880; and the Marquis di S. Filippo and Professor Uzielli have once more undertaken the task, adding, amongst other things, some 380 biographical notices of Italian travellers. Three fresh world-maps are also given by Professor Giuseppe Pennesi di Rieti, showing the routes of the principal Italian travellers in the 13th–15th centuries, from Columbus to 1600, and in the 17th–19th centuries, the last containing a special inset of N.E. Africa, with the various routes of Beltrame, De Bono, Miani, Piaggia, Antinori, the recent Italian Expedition, Giulietti, Gessi, Matteucci, Bianchi, and Massari. The list of maps, &c., forming the second volume (Part 2 of the one volume of the first edition) has also been largely increased.

The present edition is published by the Italian Geographical Society, and the Library is indebted to Professor G. Dalla Vedova for a copy of it.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

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to illustrate

Mr A. P. MAUDSLAY'S PAPER.

Scale - 23 Miles to 1 Inch.

10 5 0 10 20 30 40 50

Heights in Feet.

Longitude West from Greenwich

92° 91° 90° 89°

16° 15° 14°

MEXICO

CHIAPAS

TABASCO

YUCATAN

BRITISH HONDURAS

HONDURAS

GULF OF HONDURAS

PACIFIC OCEAN

Gulf of Amatique

Golfo Dulce

Sierra Madre

Sierra de las Minas

HUEHUETENANGO

QUICHÉ

BAJA VERAPAZ

ALTA VERAPAZ

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IZABAL

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SUCHITEPEQUEZ

RETALHULEU

SAN MARCOS

QUEZALTENANGO

TOTONICAPAN

SOLOLA

CHIMALTENANGO

SACATEPEQUEZ

GUATEMALA

ROUGH PLAN of the Ruins near QUIRIGUA

PLAN OF THE RUINS of TIKAL

Temple F is similar to E but ... from the latter towards W.N.W.

PLAN OF RUINED TOWN ON USUMACINTA RIVER.

USUMACINTA RIVER

PLAN OF TEMPLE F, TIKAL

PLAN OF HOUSE A, USUMACINTA.

PLAN OF HOUSE D, USUMACINTA.

PLAN OF HOUSE E, USUMACINTA.

SCALE 10 5 0 10 20 30 40 50 60 70 80 90 100 FEET

H. Sharbau, R.G.S., del.

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ROYAL GEOGRAPHICAL SOCIETY

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Notes on the Central Provinces of Colombia.

By Robert Blake White, C.E., F.G.S.

(Read at the Evening Meeting, February 26th, 1883.)

Map, p. 312.

Travellers in Colombia, or New Granada as it was formerly called, usually follow certain beaten tracks, taking the route of the Magdalena river, or that viâ Buenaventura and Cali, to the interior. Hence no description has ever been published, in recent times, of the districts of which this paper treats. Before, however, giving an account of these special localities I think it may be useful to give a brief sketch of the general configuration of the country, especially of its rivers and the mountain chains which determine the courses of the rivers.

The branching of the Andes cordillera into three ranges near the southern frontier of Colombia causes the rivers of this country to follow various directions, instead of the east to west course which is general all along the western slope of the Andes, from Chili northwards.

The direct effect of this division of the mountain range would be to form valleys running from south to north, parallel to the three chains. But it would appear that the volcanic forces which upheaved the central cordillera were more active, or were stronger at certain points, and that the volcanic action was continued for a longer time at other points. Hence we find that the great focus of volcanic force, represented by the volcanoes of Puracé, Sotará, &c., produced an upheaval of the country near them, and made a break in the great valley which lay between the Western and Central Andes, and thus caused the river Cauca to flow to the north and the Patia to the south.

Then, again, to the volcanoes of Pasto, Cumbal, Chiles, &c., near Ecuador, is due the upheaval of the vast and elevated table-lands on the southern boundary of Colombia. The northern limit of their action was marked by a great line of fault or fracture near El Castigo, and along this line of fracture the waters of the Patia basin excavated a passage

for themselves through the old chain of the Andes to the Pacific. The western cordillera which I have just called the old, is so undoubtedly. It is formed in the main of granites and diorites infinitely older than the volcanic rocks of the central chain, which are of post-cretaceous, perhaps even of tertiary age. It is nowhere broken by any great valley, except at the point just mentioned, from Patagonia to Darien.

A similar but later development of volcanic force caused the separation of the valleys of the Atrato and San Juan. The post-tertiary porphyries of Supia and the basalts of the Tadó Morros are evidences of this action. Directly to the eastward of this group of igneous rocks lies the great volcanic centre of Herveo, Tolima, and Santa Isabel, and there can be no doubt that the valley of the upper Cauca was for some time in the post-tertiary period converted into a lake, owing to the upheaval of the flanks of the volcanoes mentioned. However, their action also produced a fracture parallel to the opposing western cordillera, and the waters of the Cauca at last worked their way northwards and now run through one of the grandest ravines imaginable.

The distinguished geologists, Drs. Alfons Stübel and Wilhelm Reiss, who have spent so many years in investigating the structure of the Andes, directed my attention to this unexplored part of Colombia, which they were themselves unable to visit.

To the northward of the Herveo centre we have a repetition of the same development of elevated table-lands which are found round the great volcanic centre of Pasto, but on a larger scale. They extend throughout the principal part of the State of Antioquia, and as far as the junction of the rivers Nechi and Porce. The igneous rocks which from time to time have burst up upon the flank of the original volcanic centre are syenitic granite, porphyries, basalts, and trachytes. Naturally, in such a large extent of country, many fractures were produced by the movements accompanying these eruptions, and these fractures now mark the courses of the principal rivers of the country.

The State of Antioquia, therefore, although it may be generally looked upon as a great table-land, is broken up by some very deep valleys. That of the river Arma is 5000 feet in depth, and marks the line of a great east and west fracture, and the river Porce, which runs in a valley even deeper than the preceding, follows a north and south line. The general elevation of most of the country in Antioquia is 6000 feet above the sea, and it may be considered as the highlands of this part of Colombia. There is clear evidence that the river Cauca, in keeping open for itself a passage along the western flank of this great mass of eruptive rock, had a great deal of hard work to do. Over a distance of 200 miles it occupies a comparatively narrow valley, excavated by its waters in the sedimentary rocks which were upheaved and broken by the disturbing influences to the eastward. Naturally, therefore, this part of the Cauca valley is comparatively sterile, owing

to the absence of alluvial deposits; but, on the other hand, it exposes grand sections of strata abounding in mineral wealth.

The wonderful effects of the volcanic action referred to must be indisputably recognised when we note the existence of upper cretaceous rocks at an elevation of 8000 feet above the sea-level, and of post-tertiary gravels at 6000 feet in the central cordillera, whilst on the flanks of the western cordillera we find the same formations at sea-level.

The Valley of the Upper Atrato.

A great deal of information has been published respecting the lower Atrato, particularly in connection with projected inter-oceanic canals. The upper portions of this great valley, with their relatively healthy climate and fertile lands, are accessible by steamer from the Atlantic Ocean, and can also be easily placed in communication with the interior and more populated parts of Colombia. The river Atrato at Quibdó is 250 yards wide and 12 feet deep in ordinary seasons, and small steamers can go up to Lloró. The greater part of the land in the basin of the Atrato from Quibdó upwards may be said to be simply hilly, not mountainous, and generally well adapted for agriculture. There are few clearings, and the virgin forest which covers the greater portion abounds in valuable produce. The course of the upper Atrato was first surveyed by me, and it had been previously believed that the river took a more direct course from the cordillera down to the main valley. The detour made by the river accounts for the relatively open and unbroken country through which it runs. The higher portions of the valley at an elevation of 4000 and 5000 feet above the sea are very healthy, and here considerable areas of open prairie land are to be met with.

Every description of tropical produce may be cultivated, as the mean temperature ranges from 60° to 80°. Caoutchouc of the best quality abounds in the warmer parts, and the ivory nut is very abundant. Promising copper lodes exist near Quibdó, and coal is met with in several places. The Atrato itself and all the tributary streams are rich in alluvial gold, which is of very high standard. That of the river Neguá is of 23½ carats. Previous to the Spanish conquest there must have been a considerable native population, as wherever the forests in this region have been explored, extensive Indian cemeteries and sites of towns and villages are met with in great number; so much so, that on the mountain ridge which terminates at Quibdó these ancient remains are so abundant that one would almost think that a continuous line of villages existed here. At first sight the enormous trees in these dense forests would lead one to suppose that they must be of immense age; but a comparison with the vegetation which has sprung up on what are undoubtedly old Spanish mine workings dating no further back than the year 1600, convinces one that the greater part of these forests are not more than

200 or 300 years old, and probably at the time of the Spanish conquest there must have existed here vast tracts of open country, filled with an Indian population occupying themselves in agriculture and general industry.

The race is practically extinct. From the remains found in Indian graves and on the sites of villages, it may be gathered that the aboriginal races were of low civilisation. The Indians of this region did not use the curare poison for the arrows of their blow-guns. They employed and still use the extract of the skin secretion of a small black and yellow spotted frog, which they prepare in a peculiar manner. It causes instantaneous paralysis, and death in two or three minutes. Salt is said to be an antidote.

Fish are very abundant in these rivers. At a certain season the fish come up the Atrato, seeking the upper waters to spawn. The shoals are so numerous as to create quite a sensible impression upon the current of the Atrato. Special sanitary regulations are put in force by the authorities in Quibdó during this season, with the object of getting rid of the immense quantity of dead fish which are left upon the banks of the river.

Although the scanty population of these regions detracts from their present value, there can be no doubt that they will at no very distant day attract attention. As the works upon the Panamá Canal advance, so the inhabitable and productive lands in its vicinity will become valuable. For the Atrato valley, with its rich alluviums, contrasts favourably with all the region north of it as far as Costa Rica. It is easy of access from the Atlantic, and will without doubt be called upon to serve as the great source of the food supply for the Isthmus and the traffic induced by the canal.

The western frontier of the state of Antioquia, marked by the western chain of the Andes, is only 60 miles distant from Quibdó. On entering Antioquia one sees at once that it is from here that the colonists of the upper Atrato will come. This comparatively small state has a population of 400,000, of which three-fourths are whites and one-fourth mulattoes. It is a mountainous country, and its inhabitants are hardy, active, and industrious, being principally descended from emigrants from the north of Spain. The neat, clean villages and towns, and the evidences of industry shown in the extraordinary cultivation of the rugged country, strike the traveller most favourably. At present there is a track barely transitable for mules opened through the forest between Quibdó, on the Atrato, and the town of Bolivar, which is the first of any importance on the Antioqueñan frontier. The country, however, over the whole of this distance, does not present any difficulties to the construction of a good road or even of a railroad, as the western cordillera which here divides the states of Antioquia and Cauca is uncommonly low, the height above the level of the sea being only

6850 feet. As the country progresses in civilisation and commercial importance, attention will no doubt be given to this route as a means of communication between the interior and the Atlantic coast, and it is probable that political considerations only, arising from the fact of the road having to traverse the territories of two States in which the customs tariffs and other laws are not entirely in accord, have prevented this route from being selected as the preferable one for opening up the communications referred to. A scheme has been already sketched out by Mr. Francisco Javier Cisneros, C.E., for a railroad which, traversing the whole of the valley of the Patia and that of the river Cauca, would communicate with the Atrato viâ Quibdó. As the first of these rivers debouches on the Pacific coast, and the Atrato on the Atlantic, an inter-oceanic communication would thus be formed which would afford facilities for the whole of the interior trade of the country to be carried on with the ports on either ocean.

At the present time the Atrato valley has a population of 40,000, of which one-fourth are whites, and three-fourths half-caste negroes. The white population are principally engaged in importing such few articles as are necessary for clothing and general purposes amongst this very plain living people, and they purchase the gold which is obtained by the negro washers at a considerable profit, and export it to pay for the articles which they import. The negroes occupy themselves in the collection of caoutchouc, ivory-nuts, sarsaparilla, and a few other natural products, and also in gold-washing on a small scale, principally by streaming. Their wants are few, they use little or no clothing, and their food consists principally of bananas, fish, and game.

The Rivers Cauca and Nechí.

In the northern part of the state of Antioquia, the river Cauca, before joining the Magdalena, receives the waters of the Nechí and the Porce. These rivers and the extensive region surrounding their junction are of great interest. The Cauca is navigable for steamers from its junction with the Magdalena up to Cáceres, and the Nechí is also navigable up to Zaragoza, a distance of about 370 miles. An immense tract of country is thus placed in direct communication with the ports of Carthagena and Barranquilla on the Atlantic coast.

Ranges of low hills dying away in extensive plains, which are not, however, as a rule, swampy, are the characteristics of this district. The climate is hot, but not unhealthy in the sense in which the term is usually applied to hot and low-lying tropical districts. The general height of the hills is 2000 feet above sea-level, and that of the plains is 300. The population is scanty. The lazy negro race of the coast has no tendency to spread inland, and the mountaineer from Antioquia has no liking for a hot climate. The country is covered with forest. Valuable timber, dye woods, resins, balsams, and gums are found.

The finest ipecacuanha is met with near Cáceres; ginger is indigenous. The tallow-nut, the ivory-nut, and caoutchouc (*caucho*) might be collected and exported.

The Spaniards found this region was called Zenufaná, or "Land of Gold." A great Indian road, probably connecting Bogotá, the capital of the Zipa, with the Zenú and Darien kingdoms, and ultimately with Central America, traversed the country. The first Spanish "conquistadores" found immense wealth amongst the Indians, who must have been very numerous. The Indians worked the gold-mines, both alluvial and quartz, with which the whole country abounds, and they continued to work them under the direction of the Spaniards. The greater part appear to have been of a low grade of civilisation, but the artistic work in gold and pottery which is found in some parts would seem to indicate that the majority of the tribes were more or less savage tributaries of more advanced races.

The "Frontino and Bolivia," and one or two other English companies, are working gold quartz mines in this region with good results. Other mines, both alluvial and quartz, are worked in a rude way by the natives, and the total produce amounts to about 70,000 ounces per annum. Coal is abundant on the banks of the Nechí and Cauca, and the seams are favourably placed for working. The cultivation of the sugar-cane, cotton, and the cacao tree might be carried on with good results upon the lower lands adjoining the navigable rivers without it being necessary to employ the large amounts of capital so often expended in drainage and in the preparation of the land.

The country to the south of the junction of the rivers Nechí and Porce has already been referred to, as being, generally speaking, an elevated table-land. In its colder regions European vegetable produce of the principal kinds may be obtained, and labour is plentiful; the inhabitants are industrious, and thus there is good reason to believe that supplies of every description of food would be obtainable if agriculture or mining on a large scale were undertaken in the Cauca-Nechí peninsula. Although the whole of the more elevated country is traversed by rivers and streams almost uniformly rich in gold, yet the pursuit of this metal does not produce amongst the inhabitants those habits of indolence which so often accompany it in the hotter climates, where food may be easily obtained, and where the wants of the workers are so small. Of the population of the State of Antioquia about 15,000 are professionally engaged in gold-mining, and the agricultural produce obtained by the hard labour of the rest of the inhabitants only just suffices for their wants. Throughout the whole of this State the traveller is sure to meet with a hospitable reception wherever he goes, and with provisions sufficient for his necessities, although of course he will not find many delicacies. The roads are perfectly safe, no attack upon a traveller having ever come within my knowledge in 17 years' residence in the

country. The river Cauca in the turn which its course takes from north to north-east practically forms the boundary of the State of Antioquia, for these mountaineers, as already mentioned, eschew the hot climates—hence the vast districts to the north-west of the Cauca have remained unexplored. The Spaniards attempted to colonise this part after having successfully entered the country viâ the Darien and the Sinú, but their early colonies were destroyed by the Indians, and amongst them the first city of Santa Fé de Antioquia, which was afterwards rebuilt where it now stands. The enormous riches of this region are matters of history.

The head waters of the rivers San Jorge, Sinú, Leon, and Rio Sucio run through an elevated country, fertile and healthy. The lowlands and warmer climates possess their advantages, but it is particularly in this part of the South American continent that the more temperate regions possess especial merit; offering, as they do, a climate suitable to foreign immigrants, and a soil in which the vegetable products of the temperate zone may be cultivated under advantageous conditions.

The Valley of the San Juan.

The San Juan valley is to the south province of the Chocó what the Atrato is to the north. Its accessibility from the Pacific coast by steamers, which can navigate the San Juan with ease for a distance of 130 miles, makes it well worthy of notice. The idea of connecting the upper Atrato and the upper San Juan by means of a canal was the base of one of the old inter-oceanic canal schemes. The region is interesting on account of its vegetable products, and the rich alluvial gold deposits of the San Juan basin.

In making a journey from Buenaventura up the San Juan to Nóvita, one meets with no evidences of civilisation. The dug-out canoes, the naked negro canoemen, their palm-thatched huts built on stakes on the banks of the rivers, their blow-guns and bow and arrow fishing tackle, grass ropes, bark sleeping-mats and fish-traps, are all as purely primitive as if steamers and telegraphs were not known within a thousand miles of the place. The few Indians who still live in this valley belong to two tribes, the Noánama and Tadó. They marry amongst themselves, are little given to learning the Spanish language, and are fast dying out. I was much struck by the words *fathe* for father, and *chaida* for child, in the Noánama language.

The present town of Nóvita, the capital of the Province, is quite modern; the old town, which was about two miles away, was abandoned when the slaves were set free and its rich mines could be no longer worked. The country from Nóvita towards the cordillera is very beautiful, and contains large tracts of land, at an elevation of 3000 and 4000 feet, where colonists would be free from fevers.

The Cerro Torrá, about 27 miles east of Nóvita, is of very peculiar

form. A picturesque ridge of hills, running from east to west, culminates in a mountain whose summit is about 12,600 feet above the sea, and here the ridge abruptly terminates. Many expeditions had been made to reach this singular mountain, but none had ever succeeded, in consequence of the great obstacles presented by the broken ground which surrounds it. It was reached by me in 1878.

I embarked in a canoe in Buenaventura and traversed the isthmus separating the bay of Buenaventura from the river Calima, and after a tedious journey of eight days poling up the river San Juan in large canoes, I reached Nóvita. As I could obtain no information at all respecting the configuration of the country between this place and the Cerro Torrá, which was excessively broken and covered with virgin forest, I was compelled to take what preliminary observations I could to serve me as guides on my way to the mountain, as it will be understood that after leaving the open country immediately round Nóvita it was not likely in the dense forest that I should ever again get a glimpse of the mountain, until I was close upon it. I therefore measured a base on the flat land near Nóvita and took observations to determine the distance of the mountain, and I made careful sketches of all the important ridges of hills and prominent points in the country, taking their bearings by the compass.

I started on the expedition with eight negroes to cut the path through the woods, build the huts for stopping in at night, and for general exploring, and in addition I had a train of carriers who made bi-weekly trips to bring in on their shoulders the provisions which we required. I spent a considerable amount of time in examining the different streams and rivers which I crossed on the way, but did not encounter any very serious obstacle until I reached the river called the "Hospital," which evidently took its rise in the Torrá mountain, and consequently ought to have led me there. On exploring the river, however, I found it was impossible to work my way along its banks, which were too steep and precipitous to allow of one's following them at any height above the stream, and a path along the river edge itself was quite impracticable, owing to the huge rocks and the violent floods which daily came down from the mountains.

In selecting which of the two ridges which bounded the valley of the river on either side, might be the most practicable way to the mountain, I was detained for upwards of eight days, because on exploring the ridge on the left bank I found my progress interrupted after two days' work by enormous precipices several hundred feet in height, which were quite impassable. The precipices might, of course, have been scaled, but on penetrating further into the country it would have been impossible to keep up my supply of provisions and my communications over such broken ground.

The cordillera on the right bank of the river proved practicable for several miles, but ultimately a point was reached where it appeared at first sight that it had no connection with the mountain, and it was only by observing the course of the rivers flowing on either side of the ridge of hills, that I could conclude that there was really any connecting ridge between their different watersheds, which might ultimately lead me to the mountain. And here again, after discovering the ridge, I found myself detained for several days in fruitless endeavours to find a practicable path. It would appear that the entire western face of the mountain is nothing less than a series of great faults, formed undoubtedly by the upheaval of the whole of the cordillera of the Torrá, and these faults have not been subsequently smoothed down by denudation. It would seem that the country still preserves the rugged features which those great convulsions imparted to it in the first instance.

After a series of painful and tedious explorations, I was able to reach the base of the mountain, and in doing so I only found one way of getting down a continuous piece of precipice apparently over a mile long and upwards of 2000 feet in height. In only one place along the whole face of this precipice a small landslip had occurred, and in the broken rock the vegetation had taken sufficient hold to give us a footing and a holding, by means of which we might descend. The western face of the Torrá hill is a horseshoe-shaped amphitheatre which, sloping down in the first place from the head of the mountain for a distance of half a mile or so, terminates in an abrupt precipice, also of a semicircular form, over which hundreds of streams, which collect their waters on the upper slopes of the hill, fall in silver threads to a sheer depth of over 3000 feet, and collect together at the bottom, forming the river Surama, whose sources have been previously incorrectly marked as being on the eastern flank of the Torrá mountain. I found that nearly the whole of the distance traversed from Nóvita, as well as the mountain itself, abounded in auriferous quartz lodes, and the greater part of the streams showed prospects of gold in the alluviums.

Much of the country, at an elevation of 3000 to 4000 feet above the sea, is healthy and suitable for agriculture; and the schistose rocks, which are its principal characteristic, are not by any means unfavourable to the fertility of the soil. It would be quite practicable to open road communication with the river Tamaná, and if sufficient capital were employed, an important mining centre, assisted by agricultural establishments for the supply of provisions, might here be formed. The mountain of the Torrá itself consists of clay slates and mica slates, probably of Jurassic age; and the igneous rock, whose eruption upheaved this extraordinary mountain mass, is a syenitic granite.

A very large proportion of the platinum produced in the world is

obtained from the upper San Juan. If the workings were systematically carried on, a much larger quantity might be extracted. Its price in Nóvita is about 12*s.* per ounce Troy.

The bed of the river San Juan and its principal tributaries must contain a large quantity of gold. Concessions have recently been granted for working these rivers, and I have no doubt that success will attend the operations if properly and practically carried out. Should this happen, the river San Juan will throw off its incognito, and its trade will become of great value to the Pacific Mail Company, whose steamers call at Buenaventura.

The Valley of the Patia.

The Patia is the only river north of the line which, after traversing extensive valleys to the east (or inside of) the western cordillera of the Andes, breaks through this mountain range and finds its way to the Pacific. The river Cauca, which takes its rise in the same mountain as the Patia, flows directly northward, and empties itself into the Atlantic, between the central and the western cordillera. The Patia, after flowing southwards for 120 miles, turns abruptly to the west, and seeks the Pacific, cleaving a mountain chain which towers to a height of 10,000 to 12,000 feet on either side of the gorge through which the river has forced its passage, and which, up to within a mile or two of the spot, gives no sign on either hand that it would allow of such a liberty being taken with it.

This peculiarity in its course gives great importance to the Patia valley. It offers a route by which the great valleys and table-lands of the interior may be easily reached from the Pacific coast. It also presents a blending of climate from the coast to the interior, which is nowhere else to be found. Naturally, therefore, it is characterised by a special vegetation representing a zone intermediate between the hot and perpetually damp climate of the coast, and the warm dry valleys of the interior. It is well known that the upper parts of the Patia valley are rich in cinchona, and the towns of Pasto, Tuquerres, Almaguer, &c., which are situated on the higher lands, lie in the route taken by travellers. But of the lower Patia valley nothing has been published. I was commissioned in 1868 by the Government of the State of Cauca to survey this river. I found that if a road were opened through the passage of the cordillera over a length of about 30 miles, it would complete the road communication from the interior down to a point from which the river Patia was navigable for steamers down to the Pacific.

In exploring this river to ascertain where it commenced to be navigable, I was compelled to leave behind me in the interior the negroes who had accompanied me in the cutting of the exploratory path by which I surveyed the line of road, and even my personal

attendant. I hired two negroes who were accustomed annually to make the trip down to the coast from a little settlement which they had in the woods, and where they lived by hunting and gold washing. In order to avoid a considerable detour by land, and also to examine a portion of the river which was reported to be quite impracticable for navigation, it was necessary that the trip should be undertaken on a raft whose dimensions were not permitted to exceed eight feet long by seven feet wide; it was formed of corkwood and bamboos, and I was accommodated with a perch in the centre; the two negroes with their bamboo paddles took their stations at either end. On two occasions the negroes were washed off the raft in descending cascades, and once the raft was almost wrecked on a huge sunken rock in the centre of a fall some 10 feet high, and we had to lay up to repair. In the narrow strait to whose width the dimensions of the raft had been limited, the current of the river was not less than 18 or 20 miles an hour, and there was barely a space of a couple of feet left on either side of the raft and the precipitous rocks which formed the sides of the gorge. After reaching, however, the point called El Salto, the navigation became very easy and, as already stated, would be practicable for steamers down to the coast; and over this distance of more or less 90 miles I found the camping out at night on the banks of the river very interesting and on the whole amusing.

The Government has not had sufficient means at its disposal to carry out this scheme, but there can be no doubt that the only natural entrance from the Pacific to the interior of this part of Colombia is viâ the Patia.

The varied climate of the Patia valley, already alluded to, and its extreme fertility, enable it to show an extensive list of natural and cultivated vegetable produce. That comparatively delicate tree, the cacao, flourishes near El Castigo, and the vanilla, a peculiarly sensitive orchid, grows wild in the greatest luxuriance, affording pods of the finest quality. Near El Castigo there is a district in which the quality of the soil and the special climate permit of the cultivation of tobacco which rivals that of Havana. The coffee produced on the higher land, say from 4000 to 6000 feet above the sea, is of fine quality. Rare balsamic resins, such as Tacamahaco and Maria balsam, are found in the lower valley. Caoutchouc is abundant. Amongst the trees peculiar to the special climate possessed by the Patia, various dye-woods are notable, among them a valuable species of brazilwood, first identified by Professor Oliver from specimens sent home by me. My friend the late Dr. Daniel Hanbury took a great interest in the many samples of vegetable produce which I sent him from these parts, and gave me much information respecting them.

So far the most valuable product which has been exported from this region, and from the mountains at the head of the Cauca valley, where

the celebrated Pitayó locality is situated, is the cinchona bark, but unfortunately the tree is rapidly becoming extinct. No supervision is exercised by the Government nor by the owners of the forests themselves over the labourers who are engaged in the collection of the bark, and not only are the trees cut down, but even the roots are dug up, and thus every chance of resuscitation is destroyed. Cinchona trees may, after being cut down, be induced to send out saplings again if properly treated. It seems strange that, considering the facility with which any amount of land may be acquired in these districts, no effort has ever been made to cultivate the cinchona in its natural habitat, whilst we see the great interest which has been taken, and the enormous sums which have been spent, in endeavouring to do so in other parts of the world. I believe that a company has been occupied in this near Bogota, but it is the only instance I know of in the country. Some cinchona bark is still sold in this country under the name of *Pitayó*, but as a matter of fact not an ounce of bark exists in the whole of that district, the trees having been completely destroyed. The cacao trees planted near El Castigo by a wealthy Spanish slave-owner, at the beginning of this century, cover an area of nearly 100 acres, and now present quite the appearance of a forest, many of the trees being upwards of 120 feet high. They still bear fruit from their bases upwards, and the great *Erithynas*, which were originally planted to form the shade for the cacao, have long since died off, their fallen trunks lying amongst the surviving cacao trees. Near this plantation my men obtained from a young tree growing in the woods 25 lbs. weight of dry cacao beans of very superior quality. The monkeys are very fond of the pods, and naturally have scattered the seeds through the surrounding forest; and although it is well known that the cacao tree generally degenerates when left without cultivation, this is not found to be the case in this district. Near the Minamá Strait, a length of upwards of half a mile on a precipitous hillside is covered with a forest of Guayabo arrayanes—a Eugenia—in which the trees are literally overburdened with the vanilla orchid, whose long creeping roots hang down from the branches, and positively offer an obstacle to one's passage through the woods. The perfume from this forest on a fine day scents the valley for a considerable distance. The strait of Minamá is in itself quite a remarkable feature in the valley. The river Patia at this point, as may be seen by the map, drains a wide area of country, and receives an abundant supply of water from the snowy ranges of the central Andes; its volume is many times greater than that of the Thames at Richmond. The river, before entering the strait, comes to rest in an immense pool surrounded by cliffs of slate rock, from which it finds an exit through a cleft which is not more than 12 feet wide, and through which the water moves with a barely perceptible current. This fissure therefore must be of great depth.

Coal of excellent quality is abundant throughout the upper Patia

valley. Copper mines are found near San Pablo. The river Patia itself is rich in gold, and in the dry season the negroes wash out a considerable quantity.

The route by which travellers usually enter the country is by way of the port of Barranquilla, at the mouth of the Magdalena river. Steamers run up the river as far as Honda, and at Nare the road to the interior of Antioquia branches off. Five days' journey from Nare on mule-back brings the traveller to Medellin, and this route is certainly the right one to follow if the state of Antioquia is to be visited. A railway is in course of construction by Mr. Cisneros from Puerto Berrio on the Magdalena to Medellin, but only about 30 miles have been opened, and the rest of the route is traversed by a mule road about as long as that from Nare.

The port of Buenaventura, on the Pacific coast, is called at twice a month by the English steamers from Panamá. A good mule-road leads from the port to Cali, in the Cauca valley, and a railroad is being constructed, also by Mr. Cisneros, following more or less the same line. From Buenaventura to Córdoba, a distance of 12 miles, the railway is now open, and at the latter place mules have to be hired. A day and a half's riding brings one to Cali, and from this city any part of the State of Cauca may be reached by mule-roads. It would be quite possible to make a trip from England to the Cauca, visit all the principal points of interest, and return in five months, at an expense not exceeding 200*l.* The traveller should always purchase his saddle and baggage-mules for the trip; for even if he sells them at a loss, this will be but small as compared with what he might pay in mule hire. There is no danger whatever to health in such a journey as this. Buenaventura is the only unhealthy part, and the traveller need only stay a few hours there. When 40 miles up the country from the port the climate would be found delicious, and the city of Cali itself is 3300 feet above the level of the sea.

I surveyed the road from Buenaventura to Cali in 1866, and again in 1878 I laid out some 45 miles of the railroad now in course of construction, and although the work of surveying in a valley like that of the river Dagua, which the road follows, was very arduous, I was never ill. The railroad will without doubt be completed, as the portion of line now open produces a considerable revenue, and the company is thus at no loss for funds. More than three-fourths of the import and export trade of the state of Cauca pass over the line.

This lovely country, with its tropical vegetation, its grand cordilleras, and its famed volcanic mountains, is really as easy to visit as India; and as regards the language, the traveller would always find the necessary Spanish easy to learn, whilst in the towns he would meet with plenty of people speaking English and French.

From Cali to Popayan, the capital of the state of Cauca, is a three days' ride, and from the latter city most interesting excursions may be made.

The ascent of the volcano of Puracé is quite easy. A ride of six hours from Popayan takes one to the semi-Indian village of Puracé. The country traversed is picturesque, and the hill of Pisogé, formed of columnar basalt, out of which in old times the Indians carved their sacred statues, is well worth a passing visit. An introduction to the Indian chief of Puracé will procure the traveller the greatest attention. Mutton, good bread made of the wheaten-flour of the district, potatoes, and arracachas (a tuber not unlike the parsnip), may be had at very low prices. Sturdy little mountain ponies, well used to make the ascent with the Indians, who bring down the snow for sale to Popayan, are to be hired at cheap rates. If it is proposed to pass a night on the mountain, the traveller, in addition to his tent, should provide himself with plenty of firewood and dry hay, with which a shelter may be extemporised and a fairly luxurious bed made up, even on the ground.

On a fine day the excursion to the edge of the crater may be made from Puracé in the day, but only a part of the grand views which the mountain commands can be seen, as it is necessary to go round to opposite sides of the crater to see them all, and this takes some time. Dr. Stübel and myself passed a night here above snow-level, at an elevation of 14,400 feet, with a gale of wind blowing. Our Indians all ran away: our two servants were so benumbed with cold that we had to stow them away in a cleft in an old lava stream, and leave them. After three hours' hard work we managed to put up our little tent, securing it with extra lines moored to blocks of lava, which we had to roll down to their places. We could then only find part of our provisions, and as we were famished we made a perhaps too hearty supper of sardines and bread, without anything to drink. We were too tired to make beds, and slept sitting, leaning against some baggage. At two in the morning we were so thirsty that I went out to collect some snow, and had to go a long way, as the greater part was contaminated with sulphur. I thought myself well repaid for my trouble by the splendid view of the volcano at night. There was an almost full moon shining, the gale had cleared the sky, and occasional clouds drifted across the crags and ravines of the mountain's flank giving glimpses of the beautiful landscapes thousands of feet below, which appeared the more brilliantly illuminated as the dark shadows of the clouds formed their settings. Sometimes the valleys round the base of the mountain were filled with clouds, leaving the snowy towering cone to reflect the moon's light against a background of sky of the deepest blue. The "solfataras" round the cone growled a dismal echo to the howling blasts which swept past as if in search of something more impressionable

than mountains of lava upon which to wreak their fury. It was a wonderful scene, one which was worth coming far to see, and I think that a night or two spent on the mountain in order to seize the most favourable moments for seeing its sights would always be the proper programme for the traveller to adopt.

Due west of Popayan, in the western cordillera, there is a prominent mountain called the Cerro Munchique, which is so situated that it commands a more extensive prospect than any other that I know of. Dr. Stübel and I ascended this mountain in 1868, to make some observations. We found its summit to be 9892 feet above the level of the sea, and we pitched our tent upon the very top. Our supply of water was obtained from that which collects at the base of the leaves of the Bromelias which abound in these cordilleras, for the hill rises so abruptly on every side, that there are no streams within reasonable distance of the summit.

Standing on this mountain, by simply turning oneself round, one could obtain a view over more than 15,000 square miles of country. The whole of the central cordillera, from the frontier of the Ecuador to the confines of the State of Antioquia, with the valleys of the Cauca and the Patia, were visible to the north, east, and south; whilst, on turning to the westward the Pacific coast from the bay of Tumaco to the mouth of the San Juan river seemed spread out like a map before us. A more gorgeous panorama cannot well be imagined. The belts of bright-coloured vegetation, marked by the valleys with their winding rivers and streams, were backed by the great masses of the cordillera with their varied tints and snow-capped peaks. On the other hand, the dark-hued vegetation of the virgin forests of the Pacific slopes stretched down to the ocean margin, which with its thousand bays and inlets and fringe of foam which was quite visible, looked like an edging of lace. The island of Gorgona could be distinctly seen. A fair mule-road leads from Popayan to the base of the mountain, and the ascent may be made on foot in one hour. The Cerro Munchique should be visited in the dry season, for its peculiar prominence makes it a grand lightning conductor, as we clearly saw from the shattered rock on the summit.

From a numerous series of observations of the mean temperatures at different altitudes in the cordilleras, collected from a great many observers, I have formed a table of mean temperatures corresponding to a series of altitudes from sea-level up to 16,400 feet in height, which will be found very generally applicable over the whole of the Colombian territory. These mean temperatures are derived from observations made on distinct systems, but as a rule the temperature of the earth, in a part sheltered from the sun and rain, at a depth of 30 inches from the surface of the ground, will represent in these latitudes the mean temperature of the locality. In tropical regions, where vegetation is not exposed to great variations of temperature, the most important point to which the

agriculturist should look is the mean temperature, if he would judge correctly of the climate of any locality.*

In some parts extraordinary changes of temperature are observed, but in others there is remarkable uniformity. Where the proximity of deep and hot valleys to high mountainous ranges induces sudden reversals of the currents of air, great variations are met with; when, on the other hand, elevated table-lands are sufficiently removed from the valleys and the mountains to receive a more equable distribution of the atmospheric currents, an extraordinary uniformity prevails. Near the Torrá mountain, at an elevation of 6700 feet above the level of the sea, the greatest difference between the maximum and the minimum thermometers during eight days was only 9 degrees of Fahr. The quantity of ozone varies in a remarkable way, being sometimes greatest where one would least expect to meet with it, and sometimes excessively abundant without there being any apparent cause. Near Popayan, in the village of Silvia, Dr. Stübel and myself were surprised to find ozone papers colour to the highest degree on the scale in a quarter of an hour; and bearing witness, as we could, to the invigorating air of this district, we really felt disposed to ascribe its effects to the extraordinary abundance of ozone.

In taking observations of the altitudes of the western cordillera when engaged on the Buenaventura road in 1866, I was at first very much put out to find that the best hypsometrical formulæ did not give accurate results. These I had the means of testing by the levels which were being taken for the construction of the road, and which reached a height of 7000 feet above the level of the sea. I had a long correspondence with the late Professor Rankine upon this subject, and in

* Table of Mean Temperatures in the U.S. of Colombia, between 2° and 6° N. lat., compiled from observations by Humboldt, Caldas, Boussingalt, Mosquera, Reiss, Stübel, and White.

Height above Sea-level. feet.	Mean Temperature. Fahr.	Height above Sea-level. feet.	Mean Temperature. Fahr.
0·00	82·4°	9,020	55·4°
820	80·4	9,840	53·6
1,640	78·4	10,660	50·9
2,460	76·3	11,480	48·2
3,280	74·3	12,300	45·5
4,100	71·2	13,120	42·8
4,920	68·0	13,940	40·1
5,740	65·3	14,760	37·4
6,560	62·6	15,580	32·0
7,380	59·9	16,400	30·2
8,200	57·2		

The mean in the greater altitudes varies somewhat according to the greater or less extent of snow-covered mountains, and in the lesser altitudes the temperature is affected by the open or inclosed character of the valleys and by the presence or absence of vegetation. Generally, however, it will be found that the above means are sufficiently near the truth to be of practical utility.

1868 had the further benefit of the assistance of Drs. Reiss and Stübel in completing the modifications which were found necessary in the formulæ. I have found that hypsometrical observations of altitudes can be made as accurately, and perhaps more accurately, than with the barometer, but as it would be tedious to enter into an explanation of these calculations here, I purpose to furnish the meteorological department of the Society with the tables which I employ, hoping that they may be found of use to travellers in tropical countries.

In estimating the practical importance of those districts of Colombia of which this paper treats, it should be borne in mind that Colombia is, with the exception of Chili, the best governed of the South American republics. Property is thoroughly respected, the laws are fairly administered, foreigners are welcomed and protected, and every inducement is held out to attract foreign capital.

The trade of this country has been confined, through peculiar circumstances, to particular channels, and it is really surprising that so much of its produce, particularly of gold and silver, should be imported monthly into England without the general public being aware of it. The natives generally are very unwilling to try new experiments with respect to the agents and channels which they employ for transacting their business with Europe; and thus, although the country attracted considerable attention immediately after it had gained its independence from the Spanish rule, no enterprises of any moment were undertaken by Europeans, owing principally to the jealousy with which pre-existing interests were guarded. These remarks do not apply, of course, to the Government of the country, which has always been ready to afford every facility for the introduction of foreign capital and foreign labour, recognising as it does the requirements of the country in these respects.

I have been over the Isthmus of Panamá since the works on the canal were inaugurated, and as an engineer I hold the opinion that the canal may be made if the money holds out, and I see no reason to fear a breakdown in this direction. The details of the work may require modification. This undertaking alone imparts a special merit to those neighbouring countries whose produce and natural advantages may be turned to account during the construction of the canal or upon its completion, and hence I venture to think that a certain importance may be attached to the brief sketch of the imperfectly known parts of Colombia which I have given, apart from the special merits *per se* which each district possesses.

The PRESIDENT, before the reading of the foregoing paper, said that Mr. White had resided for seventeen consecutive years in the country which he was about to describe, and which was so little known in England. The name of New Granada had long been familiar to Englishmen, but the name only. The last European traveller there whose works were at all read, was Alexander von Humboldt, but he only passed

through the country from south-east to north-west, leaving to his left the large district which was the subject of Mr. White's paper. The country was one of very great interest, deep valleys with the lofty Andes on either side, rich in various productions of nature. Of all the South American States formed out of the ruin of the great Spanish colonial empire, New Granada was, next to Chili, the one that was running the most respectable and prosperous career. In most of those states revolutions were frequent, but New Granada had been comparatively free from them.

After the paper:—

Mr. C. R. Markham said that in the list of Honorary Corresponding Members of the Society there appeared no name belonging to Colombia, and yet no other country in South America had produced so many eminent scientific men, and historical and botanical geographers. The first geographical description that had been given of the country, was that written by Don Pedro de Cieza de Leon, who in 1540 landed there as a young soldier of sixteen years of age. He was determined to describe to his countrymen in Spain and to the world at large, not only the history of the conquest, but the geography of the regions through which he passed, and while his comrades slept he wrote down on any scraps of paper he could get, what he had seen during the day. The Viceroys who subsequently went out to Nueva Granada were also diligent in collecting topographical information, and Señor Garcia-y-Garcia had lately edited their reports. In the time of Charles III., Dr. Mutis was sent to Colombia, and remained there for many years, training up a number of young natives to travel over all parts of the country, and not only collect and draw the different plants, which was their primary work, but also to obtain geographical information. Hundreds of sketches of plants, and dried specimens were sent to Madrid by the Spanish General Murillo, and when he (Mr. Markham) was in Madrid, ten years ago, he found a cat and kittens making their nest among the papers. It was one of the most melancholy sights that he ever saw. Señor Zea was well known to botanists, and Señor Caldas also left many manuscripts behind him. Señor Restrepo was a geographer; Colonel Acosta, who was a good topographer, had written an admirable history; Señor Triana was a botanist of European reputation; and a former President of Colombia, General Mosquera, published a valuable work on the geography of his country, and when in England in 1865, in the days of Sir Roderick Murchison, attended one of our meetings and took part in discussion on New Granada. Colombians had thus manifested great interest in the physical conformation of their native land, and he hoped when Honorary Members of the Society were selected the Republic of Colombia would not be forgotten. Mr. White would be able to advise them as to who among the eminent scientific men and intelligent explorers of Colombia, was the most worthy to receive that honour from the Society. Colombian botanists had done valuable work for geography, and he hoped that some day it would be seen what geographers could do for history. When America was discovered there were three great civilisations on the tablelands of the Andes—the Aztecs in Mexico, the Incas in Peru, and the Chibchas or Muyscas in Colombia. The history of the conquest of Mexico and Peru and interesting accounts of the civilisation of the aborigines had been written by the master hand of Prescott; but there was an equally romantic story touching the conquest of Colombia, where there was an almost equally interesting native civilisation, which had been described in chronicles and by modern Spanish writers, but had never been written, in English, as the history of Peru and Mexico had been. No doubt it would be done some day, and the future writer would have the great advantage of possessing more perfect knowledge of the geography of Colombia than Prescott could have of Peru in the days when he wrote his history. By the

explorations and descriptions of such men as Mr. White, historians were able to give greater interest to their narratives, and accurate topographical descriptions. In that way, as in many others, geographers were useful to other sciences and to literature. With reference to the physical conformation of the mountains, they must all have been struck by the statement that the western cordillera of the Andes was one unbroken wall from Darien to the southern end of Patagonia, with only one break—the Patia. That was a most extraordinary thing, and was not found in any other great range. The Himalayas were broken through the outer line in many places, and even in the central line by the Indus, the Sutlej, and the Brahmaputra. The western Cordilleras were only broken in one place or possibly two, counting the river Santa in Peru, which flowed for 150 miles, and then broke through the range and reached the coast. That, however, was not so clear a case, for the Santa does not penetrate so far eastward as the river falling into Tumaco Bay. Mr. White had confined himself to the slopes on the western side of the Eastern Andes, and had said nothing of the vast interior of the Republic within the Amazonian basin. So that in addition to the immense amount of extremely interesting information which he had given in the paper, he had also shown that there was in that region a very great deal remaining to be discovered.

The PRESIDENT said that Mr. Clements Markham, whose knowledge of the old Spanish literature relating to the conquest and occupation of South America by the Spaniards was so well known, and who, from his knowledge of the region and of the Spanish language, had been able to contribute to English literature so much that was valuable, had shown that a great deal had been done by the natives of Colombia. But the information which they had given was not generally accessible to the public, and therefore they must thank Mr. White very much for bringing before them in such a clear and graphic manner the physical features of so interesting a country. He had shown them that Colombia was one of those regions which in the future would probably be peopled by a vast industrious population. They had heard of gold-mines and of rich valleys, the agricultural wealth of which was still undeveloped, of the canal that was being made across the Isthmus of Panama, and taking all these things into account he thought there would be little doubt that the country would, in the course of another generation, be as familiar to Englishmen as the best known portions of the South American continent at the present time. Something of the sort was needed to make South America interesting to English audiences. During the time that he had held the presidency of the Royal Geographical Society, nothing had struck him as being more curious than the intense and extraordinary interest taken in the elucidation of every portion of Africa, and the comparatively little interest taken in South America. It was useless to speculate upon the reasons, but such was the fact. There was a sentimental interest attaching to Africa which could not be aroused with regard to South America. Possibly it was due to the fact that South America was already in the hands of European races; whereas Africa offered a large field to the ambition of European powers, and at the present time certain portions of that continent were being coolly occupied by European powers as if the natives had no right whatever there. For this reason they were doubly thankful to Mr. White for having called their attention in so effective a manner to a country whose physical character, products, and population were so interesting.

Mr. R. B. WHITE in thanking the Meeting for their kind reception of his paper, called attention to the specimens of the minerals of the country which he had placed on the table. They consisted of gold and silver ores, principally from Antioquia, coal from the Patia, the Cauca, and the Nechí valleys, copper ores from the Atrato and Cauca valleys, and lead, zinc, mercury, and manganese.

Further Explorations in the Mashuna Country. By F. C. Selous.

Mr. F. C. Selous since his return to South Africa has resumed his adventurous explorations in the little-known region between the Matabele settlements and the Zambesi. He has sent us the following brief account of a journey he made in 1882, a little to the east of that described by him, and published in the 'Proceedings' for 1881, p. 352.

I have made a short journey of exploration this year, having crossed the country from the upper Hanyane to the Zambesi near the mouth of the river Umsengaisi, following thence the southern bank of the Zambesi to Zumbo, and then striking back again to my camp, keeping pretty close at first to the Hanyane, and never going very far away from it until finally crossing it when I made for my camp. According to all the recent maps I have seen, particularly that of Mr. Baines, little or nothing appears to be known regarding the physical geography of this part of Africa, so I have taken the liberty of sending you the little sketch map I have made of my trip. Supposing that the position of Lo Magondi's town (Mr. Baines' furthest point north in the Mashuna country) is correctly placed on the map and that the position of Zumbo is also correct, then all the intermediate places, rivers, &c., marked on my map cannot be very far wrong. I was very much surprised to find the mouth of the Panyame placed on all maps to the west of Zumbo, whereas it really runs into the Zambesi at least 15 miles as the crow flies to the east of that place, as I have marked it. I suppose Drs. Livingstone and Kirk travelled along the northern bank of the Zambesi. You will see that the great mountain chain of Umvukwe forms a watershed; all the rivers running from its northern slope flowing into the Hanyane, as the Umquasi, Mutiki, &c., or else into the Zambesi to the west of Kebrabasa, as the Umsengaisi. All the waters flowing from the southern slope of the Umvukwe must run into the river Mazo. I only followed the Umvukwe a certain distance, as you will see by my map, but as far as I could learn from the natives it runs right down to the Zambesi at Kebrabasa. I have marked the rivers Umquasi, Mutiki, Mabare, Umpinge, and Dande, each running separately into the Hanyane.

It is possible that some of them join before reaching the Hanyane, though I think not. The rugged mountains to the west of Umvukwe rise like a wall in an almost straight line running east and west, from the Zambesi valley. The first range must rise sheer 1000 feet from the plain. The country between the mountains and the Zambesi is perfectly flat or slightly undulating and covered with *mopani* forests, and very dry. From the Hanyane right down to the foot of the mountains water is most abundant, but below them the Umsengaisi and Panyame and all their tributaries become broad-bedded sand-rivers with little or no water

above the surface. Between the mouth of the Panyame and the Umsengaisi there is not a river or rivulet of any kind running into the Zambesi from the south. You will see that I have marked a river

running into the Panyame near its confluence with the Zambesi, the Vo-ang-wa. It is a broad sand-river over 300 yards wide, with not much water above the surface. The whole of the country travelled

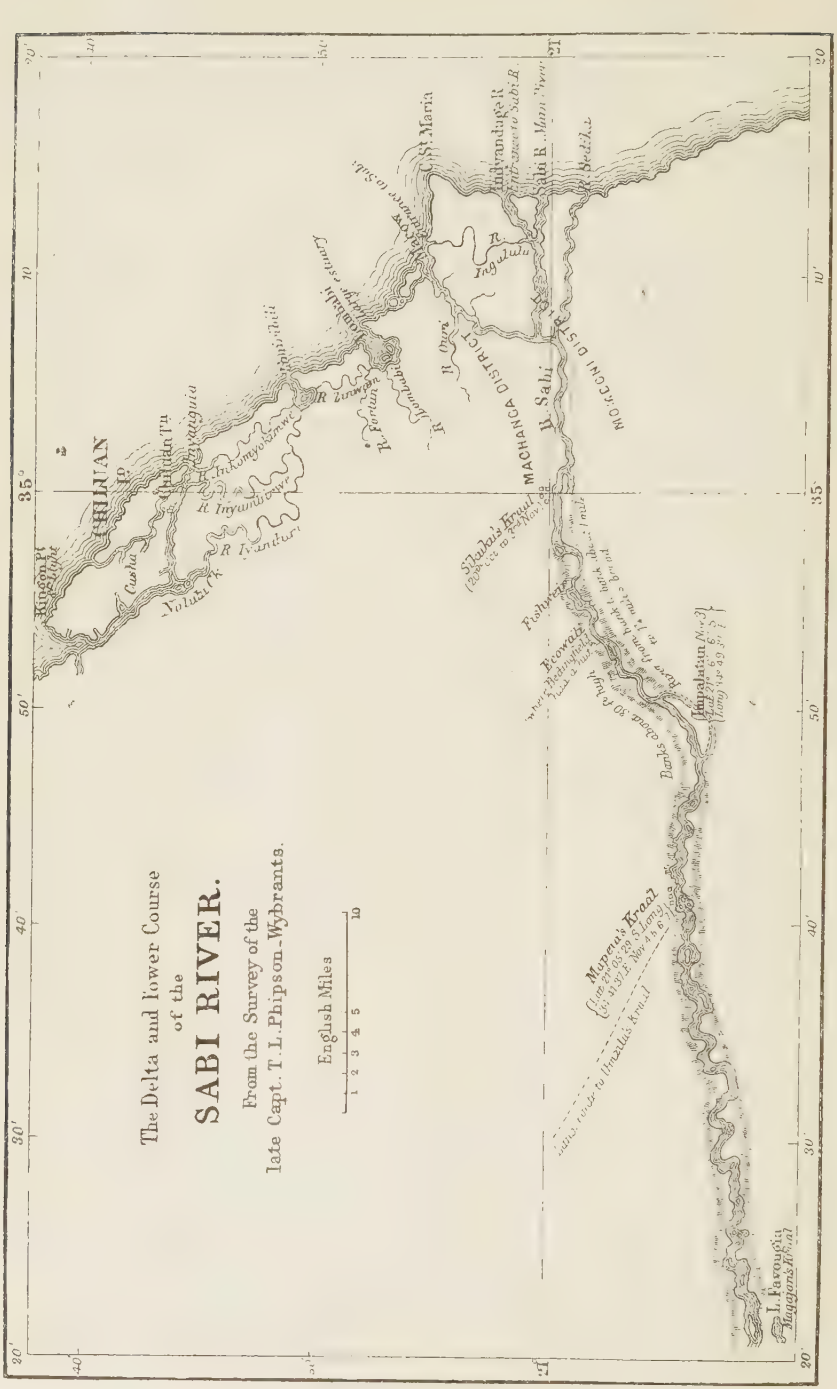
through was more or less thickly peopled by Mashunas or allied tribes. At Inyambare and other places they had large herds of cattle. Below the mountains the tsetse fly are in millions and we were very much annoyed by their incessant bites. I had seven Kafirs with me on this journey, which was a very fatiguing one, as we had to make our way through the most rough and rugged mountains imaginable. Game was very scarce too, so I had to live principally on ground-nuts. At Zumbo there were five whites (Portuguese) and they treated me very hospitably. So far both I myself and my Kafirs were all well, though we had all got very thin and weak from the perpetual bites of the swarming tsetse flies. From the Zambesi to the foot of the hills took us three very hard days' walking, the heat of the sun being terrific. Water was also very scarce and on the third night we slept without that essential, all of us being very thirsty. The fourth day we ascended the mountains and on the summit of the first range got a spring of water. This was also a terribly hard day, climbing range after range of rugged pathless mountains; though towards evening we had got through the worst of them, the country remained very rough until near the Hanyane. That evening I was seized with a violent attack of fever, the result of fatigue and exposure to the sun when weakened by the tsetse fly. I had no medicine whatever, nothing but a few handfuls of rice, and was very far away from any help and in a very difficult country to walk through. As however we had not yet reached the first Mashunas it was either a case of lie down and die or get on. For four days I pushed on, though excessively ill; then two of my Kafirs also fell sick. We had then, however, reached some Mashuna towns. Here I remained for seven days and I never thought I should pull through, as I was as bad as possible and had only rice to eat and no medicine. On the eighth day I got a little better and pushed on again, and in the middle of September at last reached my waggon near Umfule.

*** We have reproduced Mr. Selous's interesting and valuable map without adding any features from other sources, or even changing the position of Zumbo, on the Zambesi, which certainly lies a few miles further south (according to Livingstone in lat. 15° 37′) and perhaps ten miles further to the west. A comparison with the Society's large map of Eastern Equatorial Africa, sheet 24, will at once show where Mr. Selous differs from preceding explorers, not only on the Zambesi but also in the Mashuna country. These differences are most considerable on the Zambesi. The Zingesi of the Society's map is clearly Mr. Selous's Umsengaisi, but the Panyame does not join a short distance above Zumbo, but a considerable distance below that place, where no river at all was observed by Livingstone. More curious still, the region to the south of the river is described now as a vast plain, whilst formerly we

were led to believe it to be hilly. Mr. Selous shows very distinctly the inner edge of the annular plateau which seems to surround the great basin of inner Africa, and through clefts in which the Zambesi and other rivers find their way to the coast. The tract between the upper Hanyane and the Zambesi has never before been crossed by a European explorer.

The delta and lower course of the Sabi River, according to the survey of the late Captain T. L. Phipson-Wybrants.

The accompanying map is taken from one drawn with great labour and precision by the late Captain T. L. Phipson-Wybrants while on his late fatal journey, of which we have already given a brief account in the obituary notice of this adventurous traveller in the 'Proceedings' for 1881, p. 238. The map embraces a portion of the course of the Sabi river, together with the determination of the mouth of that stream, the position of Chiluan Island, and a delineation of the intermediate and extremely indentated coast-line. This district, it may be remembered, was visited by Mr. St. Vincent Erskine during his third journey into the Gaza country in 1873–4, when he partially explored the delta of the Sabi and passed through several of its channels, including the Macow branch. Starting from Inhambane, Mr. Erskine, after spending some time at Chiluan, made his way southward from the latter point to the entrance of the Sabi, and thence along its right bank for upwards of a hundred miles, thus pursuing a similar course to that taken by Captain Wybrants. That Mr. Erskine's exploration left much to be accomplished, however, is evident from the fact that the delta, tributaries, &c., of the river were laid down in his map (of which a reduction appears in the February number for 1882 of Petermann's 'Geographische Mittheilungen') in dotted lines, while the country on either side is left almost a perfect blank. The careful surveys of so accomplished an observer as the late Captain Wybrants will therefore add greatly to our geographical knowledge of this little known district. Both the course and delta of the river as laid down by Captain Wybrants differ widely in several respects from those given by Mr. Erskine. In the first place, Captain Wybrants makes the whole of the Sabi, including the southern portion of its delta, 10 miles further east than Mr. Erskine; and though this difference is not so great in the northern portion, it extends even there to five miles. The size and shape of the islands in the delta and windings of the river, again, he shows to vary considerably from those given by Mr. Erskine, in whose map, indeed, many of them are hardly distinguishable at all. This applies particularly to the southern part of the delta, where the greatest differences occur. With regard to latitude there is in the north not


The Delta and lower Course
of the
SABI RIVER.
From the Survey of the
late Capt. T. L. Phipson Wybrants.
English Miles
1 2 3 4 5 10
MACHANCA DISTRICT
MOMBCINI DISTRICT
R. Sabi
R. Inyangudzi
R. Inyandudzi
R. Inyamyosimwe
R. Inyandudzi
R. Inyandudzi
R. Inyandudzi

much variance; but the southern portion of the delta and the whole course of the river are now shown to be about five miles further north than they are made to appear by Mr. Erskine.

The Sabi is represented by Captain Wybrants as flowing into the ocean by three principal channels:—One to the north, called the Macow; another to the south, the Sedika; and the third or central one, which is divided by an island into two branches, the northerly bearing the name of the Indyanduge, and the southerly constituting the main entrance to the Sabi. There is also a smaller channel, the river Ingalulu, running north and south and dividing the larger central island of the delta into two parts.

From the apex of the delta and on the north side of the river a considerable area is occupied by the Machanga district, inhabited by the Tongas, subjects of Umzila. Here Captain Wybrants' party, who had with them a large quantity of *matériel*, were greatly inconvenienced by the impossibility of obtaining guides or bearers without the express authority of the king, whose kraal is situated about 250 miles distant (nearly due west) upon a tributary of the Sabi. Whilst waiting for this necessary permission, Captain Wybrants, accompanied by a few members of his party, started up the river in his steam launch, on November 3rd, 1880. Owing to the extreme shallowness of the water and the prevalence of sandbanks, however, he found navigation, even with a light craft, so difficult as to be almost impracticable; while the current proved of such force that his baggage raft which would have saved many additional bearers, had to be altogether abandoned. The character of the river at the outset was extremely uninteresting and monotonous, its bed consisting of a flat expanse of sand, averaging a mile across, traversed by a narrow and serpentine channel some 200 yards wide. At Mapeia's kraal, shown on the map, a halt of several days was made, but the stay was not a particularly agreeable one as the whole district is infested with mosquitos, and the heavy dews falling at night during this season drench the traveller like rain. Leaving Mapeia's the course of the Sabi becomes increasingly tortuous, and the shallows growing more numerous as the party ascended, the launch had to be incessantly dragged, pushed, or even unloaded, until deep water could be gained. The scenery here had become somewhat more enlivening; the banks were thickly studded with clusters of small kraals, and around these pastured large herds of Umzila's cattle, guarded by the district chiefs. Islands occurred about every half-mile in the course of the river, and the interminable and hitherto unsightly stretches of sandbank were now generally diversified by long fringes of dark-foliaged trees. Higher up an abundance of limestone was met with, the bed of the Sabi having become exceedingly rocky, while its banks rose to a height of 100 to 200 feet. This district is an exceptionally fertile one; large fields of tobacco and *ntama* (native corn) being constantly observed under cultivation. The natives, the

Mangi, are described by Captain Wybrants as a good-tempered and intelligent, though physically poor and stunted race.

Returning to Mapeia's on the 10th November, Captain Wybrants determined next day to leave the Sabi and strike inland for Umzila's kraal. Pursuing a north-west direction, the elevation of the country increasing sensibly as they advanced, stages of about 15 miles a day brought the party, successively, to Masundi's kraal, Umtonto Quenga (where the ant plague was so intolerable that the native huts had to be abandoned for tents), and finally, some 50 miles further on, to Macoupi's kraal, four days from Umzila.

On the journey a fair supply of duck, muscovy goose (excellent eating), guinea-fowl, and buck was obtained; and buffalo, lion, and wildebeest were seen. Here, also, the fatal tsetse-fly first made its appearance. Pombé was the native drink, very good of its kind; but water was scarce, and found at very infrequent intervals. The flora comprises bamboo, fan-palm, and the quagga-tree, the fruit of which is dried by the natives like the date, the skin being eaten and the stones made into oil, of which they contain a large quantity.

At Macoupi's the rains set in, and Captain Wybrants, harassed by the delays imposed in consequence of the insufficient notice which had been given of his arrival, and attacked by fever and sun-stroke, succumbed, after a brief but distressing illness, on November 29th, 1880.

The death of their leader produced a complete disorganisation amongst the party which, consisting of about 100 native bearers and several Englishmen, was, with the baggage and pending Umzila's permission to advance, encamped at Machanga under the charge of Dr. Ward Carr, M.D., F.R.G.S. The latter gentleman, recovering from an attack of fever, had, upon the news of his leader's death, experienced a relapse; and it having become necessary for him to lance an ulcer in his heel, tetanus set in, and he died in the greatest agony on February 14th, 1881.

A Visit to Corea, in October 1882.

By J. C. Hall, Acting-Consul, Nagasaki.*

Nagasaki, *December 11th*, 1882.

Sir,—Herewith I have the honour to lay before you some notes of observations made by me during my late visit to Han-Yang, or Söul, the capital of Corea, and to that one of its few coast approaches at present in the occupation of the Chinese forces, known as Nam-Yang harbour, or Ma-sam-pho.

* Abridged from Mr. Hall's Report to Sir Harry Parkes, H.M. Minister in Japan, communicated to the Society by the Foreign Office.

Her Majesty's surveying-ship *Flying Fish*, under the command of Lieutenant Hoskyn, whose guest I was, left Nagasaki on the 5th October, and sailing up along the west coast of Corea, anchored in Nam-Yang harbour in the afternoon of the 9th. As we came along, and afterwards while changing from one anchoring-ground to another, I had a good opportunity of observing the difficulties that beset navigators in these waters on approaching the shore. To begin with, along its whole extent the west coast of Corea is hedged in by a fringe of islands so thickly clustered together that a glimpse of the mainland can be obtained only at rare intervals through gaps in the fence. In the next place, the sea around these islands and along the shore of the mainland is so shallow that thousands of square miles of mud-flats are left bare by the fall of the tide. Again, the rise of the tide is abnormally high, averaging close upon 30 feet, thus necessitating the utmost caution in navigating and a constant use of the lead. This high tidal wave, again, causes a strong tidal current. The flood-tide rushes in like a mill-race, and the ebb flows out with scarcely less velocity, exceeding three knots an hour. To these constant sources of difficulty each of the seasons brings its own addition. In the bright spring and autumn weather there is much mirage, in the summer months dense fogs prevail; in winter a sheet of ice forms along the coast. It seems probable that these natural conditions of the west coast of the peninsula have had a large share in predetermining the exclusive policy of the Corean people. It is certain that they have powerfully aided that policy. The failures of both the French naval expedition of 1866 and of the American expedition of 1871 were due solely to difficulties of navigation.

The swiftly-flowing tide scours out channels for itself here and there through the vast expanse of mud-banks, especially in the narrow passages between the mainland and the adjacent islands. In this way the existing harbours and anchorages have evidently been formed. The anchorage of Nam-Yang is a good typical instance. At high tide it looks like a wide and commodious harbour. At low water it is seen to be merely a narrow channel furrowed by the strong tidal current flowing over the mud-flat. It lies between the main shore, north of Cape Chanoine, and a group of islets east of Taibu-do, or Le Barbier de Tinan. It is about four miles long, less than a quarter of a mile broad, and its average depth in mid-channel is under four fathoms. It is so shallow towards the sides that there is not room for two ships to swing abreast unless they were both moored head and stern. The breadth of the mud-bank on the mainland side at low tide varies from a quarter to half a mile. I am of opinion that the place is not an eligible site for a trading settlement.

Notwithstanding the foreshore of mud-flats, the appearance of the coast-line is bold and hilly, the valleys between the high grounds forming inlets of the sea. The height of the bluffs and headlands ranges

from about 200 to 600 or 800 feet. At their base the hills consist mainly of trap-rock and granite; their upper portion is a reddish clay, of a very light and porous texture, easily furrowed by the rains. Their surface is mostly covered with a coarse hardy grass and weeds, but large bare patches are not unfrequent. There is a striking scarcity of trees, not only on the coast, but also in the interior. A stunted fir, averaging less than four feet high on the coast hills, and about eight or 10 feet on the more sheltered slopes inland, seems to be the only tree that flourishes in this part of the country, and even that is by no means abundant. Upon this scanty stock of stunted fir-wood the inhabitants are mainly dependent for their supply of fuel. The under branches are carefully lopped off, so as not to injure the further growth of the tree. When dry, both leaves and branches burn like touchwood, being highly resinous. This fuel seemed to be the staple of the only coasting trade I could see. The junks that passed us going northwards, probably to the capital, were laden with it. Those going southwards were empty.

On the northern end of the islet which flanks the middle of Nam-Yang harbour stands a small village consisting of nine houses, built in the usual Corean fashion, that is to say, of mud walls thatched with straw. This was the first spot of Corean soil on which I landed, and my first observations were directed to the comparison of this with a Japanese village of the same sort. As the evidence of language and of racial characteristics shows the Japanese and Coreans to be kindred peoples, I thought it not improbable that some traces might still be discernible of their original common cult. In Japan, notwithstanding the predominance of Buddhism for many centuries, the centre and symbol of unity of every village commune is the saint's shrine at which the guardian spirit of the place is worshipped, the visible representation of the Divinity being, instead of a graven image, a bundle of shreds or strips of white paper. Close to this Corean village, the name of which I could not ascertain, I discovered the analogue of the Shinto shrine. It stood in the centre of a small grove of low fir trees, on the bluff forming the northern end of the islet, about 200 yards distant from the village. It consisted of a straw hut in the form of a bee's skep or cone, about nine feet high, and of the same diameter at the base. Facing the east was a triangular opening about three feet high. Crouching down on my hands and knees, I was about to enter to explore the inside, but the Coreans who had followed me took hold of my skirts, and, with signs of perturbation and alarm, prevented me. By gestures they signified that if I were to enter I should surely die. I at last obtained their permission to crouch down and peer in from the outside without entering. There was very little to see; the ceiling was formed of rough poles laid across and sloping towards the back, the average height from the ground being barely four feet. At the back, facing the aperture, tied to one of the ceiling-poles, hung a bundle of

strips of white paper, the unmistakable counterpart of the Japanese "Go-hei."

A short distance from the village, in the opposite or southern direction, and similarly situated in the midst of a small fir grove, stood a hut about six feet square, the sides of which were formed of coarse wicker and straw; a thick straw mat suspended by a rope formed the door; the roof was of mud and tiles. This was the Buddhist temple. Turning up the door-mat I went in, having first obtained the ready assent of the Coreans. A rough stone image about three feet high of a Buddhist saint, in the usual sitting posture, with a square stone in front, was all the hut contained. About half-a-dozen cash lay on the stone. When I added a few copper coins the Coreans were very much amused.

I have been the more particular in describing these two religious edifices, in that they were the only ones of the kind I saw. In passing the villages along the road to the capital I kept a sharp look-out for anything resembling a shrine or temple, but saw none. Just outside Nam-Yang-pu, indeed, there was a large inclosure with tile-roofed buildings, which we took to be a Buddhist monastery, but, with this exception, there were in the villages no visible evidences of the existence of any religion. Neither in the country nor in the capital did we see a cassock or a shaven pate. I am inclined to believe that the vast superiority of Japanese to Corean civilisation is, in the main, due to the influence of Buddhism.

The houses of the Corean country people are miserable mud hovels thatched with straw. In each house there is one inner room, with a raised floor, under which the smoke and heated air from the cooking-hearth passes to a low vent, or chimney, at the back. The apartment thus warmed is the sleeping-room of the family. It is dimly lighted by a paper-covered aperture in the mud wall. It contains no furniture whatever, and is generally so small that it is a wonder that several persons can sleep in it without being suffocated, especially as there are no apertures for ventilation, and the trap-door, about three feet square, is kept shut during the night. The portion of the house outside this sleeping compartment contains a mud fireplace, in which a shallow iron pot is fixed for cooking. This iron pot, a few coarse crockery jars, some wicker baskets and calabashes, or gourd bowls and dishes, constitute the whole of the household furniture. There were no signs of any middle or well-to-do class. Those who were not cultivators were officials, and the bulk of the people seemed to be living just above starvation point, provided with the barest necessaries of life.

On the 11th October I went up with two officers of the *Flying Fish* to Ché-mul-pho, where Her Majesty's ship *Champion* was lying at anchor, and next day visited the island of Yöng-jong and called upon the chief official. The Yamên, or Government House, is situated in the middle of the island. I counted fifteen civil officials in the courtyard, and

there were about a dozen soldiers besides. Here, as elsewhere, the official element seems to be very large in proportion to the population. The island is well wooded and cultivated, and a good road of over three miles long connects the Yamên with the landing-place. At several places along this road stone tablets were erected, with inscriptions stating that they had been set up by a grateful people in everlasting remembrance of the clement administration of such and such a governor. One such tablet was made of iron, and I subsequently saw two or three others like it at Su-wön-pu. They were cast-iron slabs about two inches thick, apparently of good workmanship as regards evenness of surface and flawlessness of the inscriptions, but a ragged seam all along the edges showed that the moulding had been wanting in accuracy and finish. These monumental slabs were about the only indications I saw of the existence of iron or of the knowledge of working it, and the use made of it is characteristic of Corean civilisation. So scarce is iron in the practical arts that it is not used even in shipbuilding. Corean junks and boats are fastened together with wooden pegs.

About midday on the 18th October we started for Söul. It was low water, and after getting out of the boat we had to wade up to the ankles over half-a-mile of mud to reach the pier at the Chinese landing-place. This pier was constructed by the Chinese troops on their first arrival. The fixed portion of it, running out from the land, is made of fir poles driven into the mud, to form the sides, about 12 feet apart, and the same distance from pole to pole. On both sides, between each pair of poles, another pole is lashed lengthwise, and across the line of parallel beams thus formed is laid a causeway of short battens all strongly lashed down to the beams, and the footway thus formed is covered with a layer of earth. This wooden pier is nearly 300 feet long. Then there is a floating extension of it, nearly the same length, formed by lashing bamboos together as a raft, each length of raft overhanging the one in front of it, and the whole being strongly moored on both sides to withstand the sweep of the tides. All the timber and bamboo used in the construction of this pier came, of course, from China with the troops.

On the hill above the pier stands a small earthen fort, thrown up by the Chinese to protect their communications with their ships. It is garrisoned by 100 men. Close to this fort is the Corean village of Ma-sam-pho, consisting of thirty-three houses. I had several opportunities of seeing the nature of the relations subsisting between the villagers and the troops. They were as good as could be desired. The behaviour and discipline of the soldiers were exemplary. I saw Corean women fearlessly pursuing their work in the fields as the soldiers passed to and fro, neither party taking notice of the other. Elsewhere the women in the fields fled like hunted deer on noticing our approach.

From the fort a ride of three hours brought us to Nam-Yang-pu, our halting-place for the night. Though dignified with the appellation of "Pu," or city, it is merely a large village, unwalled, containing about

300 houses. Our inn was in a small inclosure opposite the Pu-sa's Yamên. It was a small, bare, and dirty edifice, badly out of repair. There is no house in Corea, so far as I could see, fit for a European to live in. The natives, both officials and people, were very civil to us, but pestered us sadly by their curiosity. Next day we rode to the Pu of Su-wön. This is a walled city with imposing stone gateways at either end, and containing over 1000 houses. Here, as at Nam-Yang-pu, a detachment of Chinese troops were in possession of the place, and evidently on excellent terms with the people. On the roadside near the gates a few pedlars' stalls, containing such trifles as wooden combs, Corean pipes, tobacco-pouches of oiled paper, tiny looking-glasses of Japanese make, was all the city could show in the way of commerce or a market. Here and there along the streets a small quantity of eggs, fruit, vegetables, sulphur-tipped touchwood, and straw shoes were exposed on a board for sale, but no such thing as a shop was to be seen.

Next day we rode on, halting at noon at Kwa-ch'hön, a straggling village of about 200 houses, ranking in Corea as a town. Five miles north of this the road crosses the Han-gang or Söul river. As we crossed in the ferry-boat we indulged in the luxury of a bathe in the clear, swiftly-flowing stream. The Coreans never tub, and, with the exception of a bath we had at the Japanese Legation, this was the only good wash we got during our trip. The river here is about 200 yards broad, full of shoals and sandbanks, but its former bed, of dry sand and shingle, is fully a mile across. Söul lies about a mile and a half north from the river bed. We reached it about three in the afternoon. Some thousands of Coreans lined the roads as we passed through the suburbs, and an escort of thirty Corean soldiers, unarmed, met us about half a mile from the city; as we neared the walls there was a great deal of shouting and signs of a popular commotion. After being detained about half an hour in a narrow side street we had to make a détour to the east, and cross over the range of hills running south of Söul, in order to reach the Chinese camp outside the east gate of the city. This was because the feeling of the populace was opposed to our being allowed to enter the city through the great south gate. A toilsome climb and descent brought us at nightfall to General Wu's head-quarters, a large Confucianist temple and inclosure called Tong Myo.

The distance from Ma-sam-pho to Söul is, as nearly as we could calculate, about 47 miles. The stages are :—

	Miles.
Landing pier to Nam-Yang-pu	11
Nam-Yang-pu to Su-wön-pu	14
Su-wön-pu to Kwa-ch'hön	15
Kwa-ch'hön to river	5
Dry bed of river	1
River-bed to Söul	1½
	47½

From the landing-pier to Su-wön-pu the road runs nearly due east, from Su-wön to the capital nearly due north. About a mile and a half west of Nam-Yang-pu the road is crossed by a long inlet from the sea, which makes a morass about a quarter of a mile broad, across which a large mud ditch has been run to protect the footway. Between Nam-Yang-pu and Su-wön-pu the road is somewhat better, attaining the dimensions of a moderately good bridle-path. From Su-wön-pu for about five miles the road is a good, well-made highway, about 30 feet broad, with willow-trees at both sides, reminding one somewhat of the Tokaido of Japan. For the remaining 10 miles to Kwa-ch'hön the breadth is about 12 feet, and the ground hard or soft according as it skirts the hills or crosses the paddy-fields. From Kwa-ch'hön to the river the road is very uneven, ragged, and rocky, studded with granite lumps, especially where it crosses a gap over the spur of a hill, about 600 feet high, rather more than a mile south of the river.

The aspect of the country traversed by this roundabout road from the coast to the capital, though varied by alternations of hill and valley, is bare and uninteresting. Trees are very scarce, the population very sparse, and the only tillage is in the valleys. Hills and slopes, which in Japan would be terraced and cultivated to their tops, are left waste in grass, or at most dotted here and there with grave-mounds. The villages are few and small, generally situated at the foot of a hill, close to a patch of wood. Rice seems to be the principal crop, next to it comes millet, then beans and barley. There are some cotton-fields also, and close to every village a large quantity of red pepper-chilis are grown. Chilis are the principal condiment in Corean cookery, and are used with indiscriminate liberality in nearly every dish. I was surprised at the abundance of the castor-oil plant, and was told it was all required for medicine. Gourds are trained over the roofs of the huts for the supply of bowls and dishes. The only green crops I saw were the lettuce-like pickling cabbage and the large white radish; the only fruit persimmon. There is no abundance of anything in the country except magpies.

Among the most interesting of the sights to be seen along the route are the road-posts and the grave-mounds. At very irregular intervals wooden posts are set up at the roadside to indicate the distance from the capital. But the inscriptions, which are on the lower and dirtier portion, are in most cases illegible, being written with the ordinary Indian ink, which is soon obliterated by the rain. They are therefore useless as guide-posts. But they are meant to be ornamental as well, for the top part is always rudely carved into a hideous imitation of the human face, and below this, in large characters, where the topographical information ought to be, is the mysterious inscription, "Generalissimo of the Empire." They are mostly to be found in groups of from three to seven or eight together, in graduated stages of decomposition, the old ones

evidently being allowed to remain when a new one is set up. There is probably some superstitious reason for their non-removal.

The Chinese superstition of *fung-shin* or geomancy, is universal and deeply rooted in the Corean mind, and the object round which it centres is the tomb. Yet there are no inclosed cemeteries to be seen; much less graveyards contiguous to temples, as there are in Japan; nor do the Coreans bury within the boundaries of a tilled field, as is so often done in China. For a Corean's grave the only propitious situation is on a hill. The aid of a geomancer and of divination is always called in for the selection of the proper spot. A circular mound, about five or six feet in diameter, and about two or three feet high, marks the place of sepulture. Except in the case of nobles, there is no tombstone, no epitaph, no distinguishing mark of any kind. Close to the dry bed of the Han-gang, where it is crossed by the Su-wŏn road, there is a spur of a hill which is deemed a particularly propitious site for interments, and its whole surface is studded with thousands of such grave-mounds, as like one another as peas, and as thickly clustered together as it is possible to crowd them, and not one of them marked by any tombstone, inscription, decoration, or distinguishing sign. Yet each is known to, and recognised by, the family to whom it pertains, and their vested rights have to be most carefully respected in the case of every fresh grave dug in the vicinity, so that the integrity of the geomantic conditions be not tampered with nor encroached upon. Disputes between those who have ancestors buried in a particular spot and others who wish to bury near the existing graves are of frequent occurrence, and when the decision of the juridical official is in favour of the new-comer's claim, the old grave is sometimes opened and the remains reinterred in another site. It would be interesting to ascertain on what principles the decisions in such cases are based.

The 21st and 22nd October we spent in seeing the city of Söul. It is in the form of an irregular oblong, and runs lengthwise in a valley that runs from north-east to south-west. On its northern side is a range of bold granite hills, the topmost peaks of which are about 3500 feet high; on its southern side, trending to the east, is a long chain of hills about half that height. The city wall is carried along the top of the southern hill; but the steep crags of the northern side require no artificial strengthening. Such parts of the wall as I examined could be easily demolished by very light artillery.

The population of the city is about 240,000. The houses are about eight or nine feet high, built of stone or mud, and mostly roofed with tiles. A long main street, about 100 feet wide, running east and west, divides the city into two nearly equal portions. In the northern half are the walled inclosure containing the king's palace, and the more important public buildings. The royal inclosure is bounded on its north side by the precipitous sides of the granite peaks aforementioned; on its

south side it is entered by three great wooden gates, the central and principal one of which is called the Thoi-hwa-mun; the one to the east of this is the Hwing-hwa-mun; that to the west the Kwang-hwa-mun. Inside the inclosure are two palaces. The older of the two, in which the king has resided for the last eight years, is close to the Thoi-hwa-mun. The other, close to the Kwang-hwa-mun, was built about forty years ago. The king lived in it for about six years after his accession to the throne, but a conflagration which partly destroyed it compelled him to move into the old palace. It is now being rebuilt.

A street about 60 feet wide from the front of the Thoi-hwa-mun intersects the main street at right angles, dividing the northern half of the city into eastern and western quarters. At the point of intersection stands a pavilion called Chong-kak (the "Bell Kiosk") from a large bell about seven feet high which is placed there. This spot is regarded as the centre of the city; and from it another street, as wide as the main street, branches off to the south-west and terminates at the Nan-tai-mun. The four wide streets which thus radiate from the "Bell Kiosk" are known as the four Chong-ro or "Bell roads." The great bell is rung every morning as the signal for opening and shutting the three great gates of the city, namely, the Tong-tai-mun and Sö-tai-mun at the eastern and western sides of the long main street, and the Nan-tai-mun already mentioned. Another conspicuous feature of this central spot of the city is the row of large warehouses two storeys high, the lower portions of which are divided off into little shops, opening into a small central court-yard instead of facing the street. The shopkeeper squats on the narrow verandah in front and serves his customer, who stands below in the court-yard; for the shop itself is too small for a man to stand upright or turn about in. As the wares are stowed away in shelves and closets inside, it is a matter of considerable difficulty to find out what sort of wares are sold in any particular shop. The principal wares are silk and cotton goods, boots, paper, and brass-ware, all of native production. The boots are made in the Chinese shape, of ox-hide, not tanned into leather, but dried and stiffened into a substance as hard as horn. The uppers are made of this as well as the soles; and the boot feels as harsh and uncomfortable to the foot as if it were made of iron. It would be altogether impossible to wear it but for the thick cotton-wadded bags in which the Coreans incase their feet by way of socks. The paper is made of the same material and in much the same manner as Japanese paper, but is much stronger and tougher in texture. The brass-ware, mostly domestic utensils, such as bowls, candlesticks, spittoons, and ash-plates, shows, by its chisel-marked furrows, that it is finished off in the lathe after being cast.

The height of these magazines is not much over 20 feet, but by contrast with the low dwellings of which the rest of the city is composed they present quite a grand appearance. They belong not to

individual merchants, but to the Guilds, who have hitherto had the exclusive right of trading with the Chinese at the frontier gate.

The main street of Söul is, as I have stated, about 100 feet wide; but as in front of nearly every house stands a rude wooden shanty, thatched with straw, used only for business purposes, as shop or workshop, the thoroughfare is narrowed to about 60 feet, and the appearance of the street rendered poor and mean. There are drains at the sides of all the streets, large and small, but heaps of filth and rubbish are allowed to lie about everywhere, and more disgusting still, the privies of the dwellings frequently empty through holes in the wall into the street drains. Altogether the aspect of Söul is uninteresting, shabby, and squalid.

We lost no time in calling at the Japanese Legation, where we were most cordially welcomed and hospitably entertained by Mr. Kondo, Consul in charge of the Mission, and Mr. Hisamidzu, Secretary of Legation. To the unstinted kindness of these gentlemen we were indebted for guidance, interpretation, and assistance in seeing the sights of the city, and for nearly all the information we gleaned respecting it. The Legation is situated in the south-western quarter of the city, not far from the Han-tai-mun, in a slightly elevated locality known as the Ni-hyön, or "Mud Mound." The Yamên now occupied by the Legation formerly belonged to the chief of the city police, but had, of course, to be much altered and improved to fit it for its present purpose. A guard of thirty men are stationed inside the inclosure. The main body of the Japanese force, 400 strong, is quartered in a Yamên about 100 yards distant. The approach to both Yamêns is by dirty narrow lanes. The new Japanese Legation is to be built not far from the present one, but on higher ground, at the foot of the southern range of hills.

The chief public buildings, apart from the royal inclosure, are three palaces, two of which belong to the king, while the third belonged to his father, the Tai-wön-gun. The Nam-kung, or "Southern Palace," stands near the south great gate. It is in this that the marriage ceremony of the Corean kings is always celebrated; but it is ordinarily occupied by the generalissimo and a body of soldiers. The Nam-pyöl-kung, or "Southern Separate Palace," stands near the western great gate, and is reserved exclusively for the reception of the Chinese Envoys, which Corea receives from her suzerain the Celestial Emperor, on all special occasions of state ceremonial, such as the investiture or marriage of the king, his vassal. It is now the headquarters of General Wu, Commissioner for Corean Affairs. The Un-hyön-kung, or "Cloud-mound Palace," is in the northern side of the city, between the royal inclosure and the main street in front, and between the central and western palace gates (the Thoi-hwa-mun and the Kwang-hwa-mun). This was the city residence of the ex-regent. It is by far the strongest inclosure in Söul.

It is surrounded by a strong stone wall, and some of the stones of the main gateway are of immense size. It is at present unoccupied. The dignity of these mansions is indicated not so much by the style of architecture, which is that of the one-storeyed Chinese Yamên, as by the extent of ground included in their precincts. They reminded me of the *yashiki* or inns of the Japanese Daimios, which used to form such a prominent feature of the old city of Yedo. The offices of the six ministries or administrative boards, the Ryuk-phan-so, are small houses at the head of the street leading from the Kwang-hwa-mun to the main street. In size and appearance they are very little superior to an ordinary private dwelling.

Mr. Kondo informed me that the total population of Corea, according to the Government census, is about 6,840,000 souls. The revenue of the king, that is to say, of the State, is derived entirely from the land tax. The unit of cultivable area for revenue purposes is the *kyöl*, the equivalent of which, in superficial measure, I was unable to ascertain. The estimated total yield of the country is 468,306 kyöl of rice-land, and 309,807 kyöl of other cereals. The land tax, payable at option in money or in kind, is 750 Corean taels (*nyang*) per 100 kyöl for rice-land, and about two-thirds of that sum per 100 kyöl of other cereals. The rate of exchange when I was in Söul was about five nyang equal to one dollar Mexican. Taking the sterling value of the dollar at its present current rate of 3*s.* 9*d.*, the annual revenue of the kingdom of Corea is a trifle over 190,000*l.*

The Chinese troops at Söul numbered 3600, of whom only about 600 were quartered inside the city. The main body was distributed in five fortified camps which they have thrown up at various points round the city within sight of the walls. The behaviour of the soldiers whom we met roaming in and about the city, was excellent, and they seemed to be on the best of terms with the populace. I believe it is the intention of the Chinese Government to retain the force in its present position and strength so long as the Japanese troops remain.

We left Söul about noon of Monday, the 23rd October, after paying a visit of thanks to General Wu, and by hard riding succeeded in getting back to the *Flying Fish* at 9 o'clock the following night.

GEOGRAPHICAL NOTES.

The Victoria Nyanza and Mount Kenia Expedition.—We have received the following telegram from Zanzibar, reporting the progress of Mr. Thomson's expedition :—"Thomson left Bura for Taveta on 29th March, and is expected to arrive there about 1st April. All well. Fischer has reached a place south of Chaga, and is awaiting caravan." Bura is about 100 miles in a straight line from Mombasa, the traveller's

starting-point. Taveta is at the south-eastern foot of Kilimanjaro, and is a place where a caravan-route branches off from the Mombasa-Chaga route in a north-westerly direction. Mr. Thomson succeeded in engaging 149 men, porters and guards, for his expedition. He intends passing to the north of Kilimanjaro on his way to Kavirondo.

Tribes related to the Zulus in South-Eastern Africa.—Pasteur Berthond, of the Mission of the Canton de Vaud in South Africa, has communicated some interesting information with regard to a tribe which occupies the region between the Transvaal frontier and Lorenzo Marques. At Valdezia, the pasteur's station, south of the river Limpopo, he finds himself in the midst of a tribe known by several names, and whom it has been hitherto difficult to classify either as Zulu or Chuána. However the unerring test of language, applied by a competent scholar and linguist, has settled this point. The language is called Gwamba; it is a sister language of the Zulu, and is the same as appears in vocabularies as the language of Lorenzo Marques. They call themselves Ma-Gwamba, as Gwamba is the name of the devil, which they use in their imprecations, and after which their neighbours, hearing them use the word, have called them, and in default of a better they accept that name. But their more distant neighbours, who speak Súto of the Chuána branch of Bantu languages, find it hard to pronounce the word Ma-Gwamba; they cannot turn it round in their mouth, and consequently call it Ma-Kwápa and Ma-Kwamba, as the name appears in German maps.—The Boers call them "Knobnoses," on account of their tattooing, which custom they have now left off.—But of the Ma-Gwamba there are two sub-tribes, speaking a different dialect; south of the Limpopo is the pure Gwamba dialect, north of the Limpopo is the Hlengwe; hence the tribe is called in German maps Ba-Hloekwa.—It is not yet clear what the meaning of the words Tonga, Ba-Tonga, Ama-Tonga are, they may, as stated by St. Vincent Erskine, be a generic term applied by the Zulu conquerors to all the tribes which have submitted to them. It is, however, certain in M. Berthond's opinion, that the Gwamba consider Umzila and his Ba-Ngoni to be Zulu.—M. Berthond also mentions that the Ba-Tonga, who dwell close to the new station of the Free Church of Scotland at Bandawe on Lake Nyassa, are akin to the Gwamba, as he and Mr. Lawes of the Free Church have submitted their language to a test. The Ba-Tonga on the Nyassa could understand sentences read out to them in Gwamba.—The Ma-Gwamba at present occupy the coast from Lorenzo Marques as far as Sofala, and spread into the interior as far as 300 miles from the sea, to Valdezia in the Transvaal. If the pasteur's statements founded upon personal knowledge are supported by others, this tribe is one of great numerical importance. He is now preparing a grammar, and a descriptive statement accompanied by a map.

The Congo.—At the third meeting of the German Geographical Congress held at Frankfort on the Main in the last week in March, Herr Pechuel-Loesche, the experienced West African traveller, who was a member of the German Loango Expedition in 1873–76, and has since served as second in command to Stanley at Stanley Pool, delivered an interesting address on the geography of the Congo. He described the mountain range which is the cause of the obstruction to navigation on the lower part of the river, as running from south-east to north-west, parallel to the coast. The range, though not presenting any striking mountain scenery, nor rising to a great elevation, like every other African coast chain suffices to shut out the interior of Africa from the seaports. The range was found to be of Cambrian formation by Dr. Lenz, the geologist who surveyed it in the district of the Ogowé, and by the German African Society's Expedition, who studied it near the Loango coast. As it approaches the basin of the Ogowé, going northwards, the chain recedes far from the coast, and opens up easy waterways into the interior, but further to the south, in the Yamba district, it approaches so near the Atlantic that its highest summits are visible from sea. This southern part runs parallel to the coast at a distance of about 20 nautical miles, it then gradually recedes further inland so that the Congo mountain chain is distant about 50 miles from the coast. The surface geological formation of the Congo region is a kind of sandy loam, which is very porous and absorbs moisture like a sponge. It varies from a bright red to a dull brown, or warm ochre colour. The mountains are not high and the difficulties they present do not seem of great magnitude at first, for they only begin when the traveller is in their midst. Their height is generally not more than from 700 to 1000 feet, some elevations on the northern side reaching 3300 feet. But the rounded and softened forms of the chain detract from its grandeur, and the impression produced is that of wearying monotony. In the Congo district, the mountains commence from a sloping plain, which rises gradually from the coast towards the interior, and attains a height of about 1000 feet above the sea-level. It forms an elevated belt about 200 geographical miles in width. The difficulties which travellers encounter arise from the fact that the different groups of elevations are separated from each other by precipitous chasms, varying in depth from 150 to 800 feet, which have to be descended and reascended, and naturally do not facilitate land travelling. The mountain slopes are often at an angle of 45, and offer therefore great drawbacks to their ascent and descent. All the mountains have one and the same appearance, viz. that already described:—rounded summits of nearly the same height, and are covered with a uniform vegetation. The grass presents a wonderful verdant aspect in the rainy season, in fact till spring-time; it afterwards assumes a straw colour, brilliant in the sunlight with the thousand hues of the yellowish-brown. Another pretty sight is offered by small, dwarf-like

trees, the poor and apparently leafless bushes, as they stand on the hills. Among them we find the *Anona senegalensis*, the *Pavetta canescens*, and the beautifully frondescent *Camoensia maxima*. The more luxuriant aspects of vegetation are hidden in the lower recesses of the mountains; a dense leafy jungle of lofty trees, varied here and there with groups of palms: in their depths flow the many winding mountain streams, haunted by the wild animals, of which, however, there are but few. Some birds, among them the rhinoceros bird, flocks of monkeys—perfect nuisances they are with their hissing and whistling, though sometimes amusing as they race up the steep mountain slopes—a few antelopes and buffaloes and the elephant make up the quota. The African elephant is, however, of such a migratory disposition that many years often elapse before he again appears on the spot where he once was seen. Further north, in the Kuilu district, where the highest mountains approach close to the sea, we meet with another feature: there we find the great forest of Tschiyombe; and it is significant that whilst the natives of the lower Congo always speak of the interior as Miongo, the mountain, the coast people further north use the appellation Miritu, the forest. The villages on the Congo are built on the high and bare mountain peaks, like robbers' nests, resembling by their position the German castles in mediæval times. There are no trees on the mountains, the natives having destroyed all forest-trees, either by cutting or burning. Their object for this is that they may have some spare ground to cultivate; they burn the grass and accordingly destroy all traces of vegetation. Many of the mountain brooks tributary to the Congo have scooped out deep beds and join the main stream on the level, but other larger rivers flowing from the interior over horizontal strata have not cut their way so deeply, and at their junction form cataracts. Thus the Luenga falls into the Congo from a height of more than 300 feet, and the Luvubi precipitates its waters into the great stream from a height of 500 feet. The main Congo is the only stream of the region which cuts through the whole breadth of the mountain-ridge. It does not flow through a valley, but through a ravine. Its waters rise twice a year, up to 20 feet. It swells from September to January, and falls from January to March; attaining its greatest height during the rainy season, April and May, and its lowest level in July and August. Its cataracts present great obstacles to communication, though they are not on the scale we might expect in so great a stream. Only one fall is vertical, viz. that of Isangila, and that has a height of only 16 feet, and it does not occupy the whole breadth of the stream. In the rainy season when the rise attains its greatest height, all the waterfalls disappear in the uniform flow of rushing and swollen waters. Another feature of the Congo is the number of rapids during its whole course, similar to those of the St. Lawrence in North America. Viewed from a height, they do not appear dangerous; the waters, when seen from afar, have a mere

bubbling look, like that of some brook passing through a mill. But if you descend, then you will wonder at the magnitude and power of the waters, and you will acknowledge how perilous must be the navigation. Altogether, from Stanley Pool down to its estuary, the Congo has a fall of 928 feet in a course of some 300 nautical miles. Its greatest fall lies in the eastern half of the mountain obstruction. From Stanley Pool to Manyanga it is 498½ feet, from Manyanga to Isangila 98 feet, and from Isangila to Vivi at the foot of the last fall, 295 feet. Another peculiarity of the Congo is the sudden disturbance to which its waters are liable. Sometimes a mass of foam will be seen to appear without notice on the water; the whole stream becomes violently agitated, and seethes and boils. The general explanation of this phenomenon is as follows: the Congo has not always the same velocity; in its upper course, for instance, it glides with a rapidity of four miles an hour, but in its lower range it flows much more slowly. Numerous cliffs and rocks obstruct its way; there are besides, a number of counter-currents, some diagonal across the river, others emerging below and consequently creating whirlpools. These eddies or whirlpools are always strong enough to knock about a small boat, either until the rotatory movement ceases, or till a favourable current allows the skiff to follow its proper course; they generally show themselves all of a sudden, and exist permanently in a very few places only.

King Makoko of Stanley Pool.—Dr. Pechuel-Loesche on being questioned on the occasion mentioned in the preceding note regarding the status of the chief Makoko, gave the following information. The Makoko question, he said, was a puzzle even for people who had some practical knowledge of the Congo district. When Messrs. Bentley and Crudgington, of the Baptist Mission, first visited Stanley Pool in 1881, immediately after M. de Brazza's treaty negotiations, they found on the northern side of the Pool a friendly chief named Buaba-nyali, who had accepted a French flag from de Brazza, but then asked his new visitors for an English flag, which however was not given him. The two Englishmen afterwards crossed to the southern shore, where they found the chief Nga-liema at his town of Ntamo or Kintamo, an able and influential potentate, who had formerly made blood-brotherhood with Mr. Stanley (on his first voyage of discovery down the Congo), and whose territories now adjoin the Belgian station of Leopoldville; Nga-liema has since maintained that he had made no concession to M. de Brazza. At Ntamo, Messrs. Bentley and Crudgington were met by two coloured seamen, wearing French naval caps bearing the name of *Eurydice*, who had come from a place called Kinchacha, also on the southern shore, one of whom, the sergeant Malamine, exhibited a document of annexation signed by the "Makoko" and M. de Brazza, and declared that Nga-liema was a nonentity, the Makoko of Kinchacha being

the sovereign of all the Batekes. Going then to Kinchacha, the two English missionaries met with rough treatment, and soon after returned down the Congo. During Dr. Pechuel-Loesche's residence at Stanley Pool in 1882, where he held the command of the Belgian expedition during the absence in Europe of Mr. Stanley, he often met the son of the Kinchacha chief, who assured him that his father had ceded no land to M. de Brazza, and had no French flag in his possession. He (Dr. Pechuel-Loesche) saw himself no French flag or any representative of M. de Brazza, either at the Pool or anywhere else on the Congo, the two coloured sailors having apparently taken their departure. Thus it appeared there were many Makokos—(1) on the southern shore of the Pool; (2) the trusty friend of Stanley, from whom he had bought for the International Association a large tract of land on the southern shore of the Pool, and extending far inland; (3) a chief living far away to the north-east of the Pool, with whom M. de Brazza's treaty appears really to have been made. Of this chief, Dr. Pechuel-Loesche could give no information, but he was certain that he had no power over the other chiefs and the Bateke people. The word *Makoko* meant simply "the ruler of the stream." There was a fourth Makoko, Buaba-nyali, the chief on the northern shore, besides a number of other titled kinglets. None of them has a right of precedence over the others, or any title whatever to be sovereign of the Bateke population of this part of the Congo.

The Wakwafi Raid on the District near Mombasa.—The Rev. Thos. Wakefield, writing from Jomva, near Mombasa, on the 13th of March, adds some interesting particulars to his former communication respecting the visit of marauding Wakwafi to the district in which his mission is situated.* He says:—The universal opinion in these districts is that the freebooters who overran the country a few months ago were not true Masai, but people from Arusha (a district south of Kilimanjaro and west of the Luvu river). This view is strengthened by two considerations: first, Mr. Ramshaw, one of my colleagues, who walked up here from Pangani a month ago, frequently came upon the tracks of the invaders, the grass being trodden down for many miles. Secondly, whilst in the Giriyama district they had fed freely upon the fruit of the papaw tree, and eaten of all vegetable food that came in their way—a habit altogether contrary to that of the beef-eating and milk-drinking Masai and Wakwafi. It is, besides, reported that they carried off implements of agriculture, hoes and so forth, from the huts of the natives, which the Masai and Wakwafi would not do, as they never turn a sod. These troublesome predatory tribes, however, are fast losing the purity and speciality of their race; they have been broken and reduced, and are now beginning to combine agriculture with their original pastoral occupations. If it is true that they came from Arusha, this

* 'Proceedings,' *ante*, February No., p. 99.

would be their first visit to those localities, and Ribé must have been the furthest limit north of their forays.

Communication between Lakes Nyassa and Tanganyika.—Mr. James Stewart has resumed work on the "Lake-Junction road" between Nyassa and Tanganyika, which was interrupted in 1881 by the massacre of some of his men by a local chief, whose violent act was disapproved of by all the headmen of the neighbouring country. He is now so far advanced that he has written to Scotland to say that he is ready for the steamer which the London Missionary Society had intended to send by this route for launching on Tanganyika, and that he had good hopes of being able to convey it safely across the portage to the waters of the northern lake next dry season. The steamer called the *Good News* has been accordingly sent, and is believed to be now at Karonga's at the head of Lake Nyassa, ready to be carried in its 400 sections along the road to Pambete. His present station, from which he writes on the 22nd December, is in Mwembera's Valley (about 70 miles from the north-west shores of Lake Nyassa), on the banks of one of the permanent streams of the uplands; a small stream, but having beautifully pure water fresh from the mountains. He had fixed upon an excellent site for a new station of the Free Church Mission, near Maliwanda's village, some miles nearer Nyassa than his own headquarters. On the side of Nyassa hills rise to a height of 1500 feet, covered with trees green all the year round, but towards the west a straight horizon line alone bounds the view. The elevation above the sea is about 4000 feet; the soil is not very fertile, but cattle and sheep thrive well.

Public Schools Prizes Examinations.—The result of the Society's Examinations this year is as follows:—Physical Geography (Examiner, Prof. H. N. Moseley, F.R.S.): Gold Medal, Thomas Rose; Silver Medal, Samuel William Carruthers, both of Dulwich College. Honourably mentioned: James Douglas Dallas (London International College), Edward George Stubbs (Liverpool College), Charles Alexander Maclean Pond (City of London School). Political Geography (Examiner, General Sir J. H. Lefroy, R.A., F.R.S.): Gold Medal, Sydney Charles Farlow (Harrow School); Silver Medal (not awarded). Honourably mentioned: Arthur Frank Bowker (University College School).

International Congress of Orientalists.—The Sixth Congress of Orientalists will be held this year at Leyden, from the 10th to the 15th of September. An organising committee has been formed, with R. Dozy for its President. All communications relative to membership are to be addressed to M. W. Pleyte, the Treasurer, at Leyden.

Obituary.

Mr. W. H. Johnson.—Information has lately been received from India of the death of Mr. W. H. Johnson, the surveyor who made the remarkable journey across the Kuen Lun to Ilchí, in 1865. We have received from Colonel H. H. Godwin-Austen, F.R.S., the following account of his life and labours :—

Mr. Johnson was in the service of the Maharajah Rhunbir Singh, of Jummoo and Kashmir; and he died at Jummoo, on the 3rd of March, under most melancholy circumstances, being fully persuaded that he had been poisoned, and an investigation into the circumstances is pending. His former services as a civil assistant in the Trigonometrical Survey are better known in that department than to the general public in England; there were few men living who had greater experience of mountain work, and none who had ascended to greater heights, and the work he did was of considerable value and magnitude. A résumé of these services will be given in this notice.

Mr. Johnson's father, a much-respected pensioned Ordnance officer of the East India Company's Service, lived at Deyrah for many years, and educated his son at Mussooree, and placed him at an early age in the Civil Branch of the Survey Department. The young surveyor began his career in 1848, under Captain du Vernet, in that splendid school of mountain surveyors, the North-West Himalayan Survey, and remained working in the outer range of the Punjâb Himalaya, with Captain du Vernet, until 1851–52, when that officer was transferred to Assam. For a short time, he was employed in carrying on route surveys in the Punjâb, and in 1852–53 he was placed in Mr. Logan's party on the Chenab river. In 1853–54 we find him in Mr. Mulheran's party which was carrying on the triangulation over the range between the Bhagirathi and Kanawar, and here he made his first considerable ascent of the Snowy Peak near the Néla pass, which was recorded, as follows, in the Survey Annals, 1854 :—

"This was the peak that for two seasons challenged the mountain climbers of the North-West Himalaya Series; on the 22nd of June it was ascended by Mr. Johnson, and his observations from the summit realised the results desired by the Surveyor-General in the connection of the Bhagirathi and Sutlej-Spiti-Chandrá series." This portion of the North-West Himalaya series was one of the stiffest they had to do.*

The annexation of the Punjâb in 1849 had brought us into political relations with a vast area to the north and west of the mountains of which Captain du Vernet had commenced and nearly completed the survey; and the Triangulation was ready for another grand advance. We had lately given the sovereignty of this country to Rajah Goolab Singh, so there were no political difficulties, and in 1855, the Surveyor-General (Colonel, afterwards Sir Andrew, Waugh) obtained the sanction of the Government of India to form the Kashmir Survey Party; and in that year, Mr. Johnson having been selected, on account of the experience he had gained surveying in the North-West Himalaya, marched up the camp from Deyrah, and

* For further detail of Mr. W. H. Johnson's work, I must refer the reader to "The Introductory Account of the Topographical Operations of the Kashmir Survey and of the North-West Himalaya Series;" extracted from vol. vii. of the Synopsis of the Results of the Operations of the Great Trigonometrical Survey of India.

His report on his Journey to Ilchí was read at the Evening Meeting of the R.G.S. of November 12th, 1866, and published, with map, in vol. 37 of the 'Journal,' p. 1.

joined Lieutenant Montgomerie in the Punjâb, and with that officer took a leading part in the triangulation which was taken over the Pir Punjâb range (15,000 feet). This triangulation that autumn was extended by Johnson over the Lidar and Sind valleys.

In 1856 Mr. Johnson was deputed to the Kishangunga valley, having previously selected and built the Trigonometrical Station of Haramukh (16,000 feet).

In 1857 the outbreak of the Indian Mutiny altered to a great extent the plans of the officer in charge of the Survey Party. Political relations were in a critical state and kept Captain Montgomerie entirely at Srinagar during that season and the next; so that the principal part of the triangulation fell to Mr. Johnson and other assistants, and from that time until the completion of the survey he took the lion's share of work. He formed stations and planted the 12-inch theodolite on some of the highest peaks that had ever been ascended and observed from, and to him great honour is due in ascending to the greatest fixed altitude of any one belonging to that survey party, not excepting the topographical assistants who visited in turn all these trigonometrical points, to sketch in the country on the plane table.

I shall now briefly note Mr. Johnson's work in the different seasons after 1857, which must be added to the preceding record of three years. In 1858 he was in Badrawar and Padar in the valley of the Chandrabagha, and later on in the season, he started the triangulation on the Indus and Shayok. In 1859, his highest station in the Indus series, Spangpochigo, was 18,826 feet, and the average of his stations was 17,500 feet. In 1860, in Rupshu, he twice ascended peaks little short of 20,000 feet, the greatest height from which regular observations had as yet been taken.

In 1861, he extended the Rukshu series to the Baralacha pass, and thus connected the Kashmir Triangulation with that of the North-West Himalaya; three of his stations exceeded 20,000 feet. In 1862, he worked from Leh in Ladakh to the Chinese frontier; the average height of his stations being 19,877 feet, two being 20,866 feet and 20,552 feet respectively, and he visited one peak which was 21,059 feet, but was prevented by a snowstorm from observing from it. In 1863 he did not accompany Captain Montgomerie. In 1864, Mr. Johnson was at work again on the high plateau north of the Changchenmo valley, with Messrs. Clarke and Low; and in 1865, when deputed again to continue the reconnaissance work of the preceding season, which had reached the southern flank of the Kuen Lun, he made his famous journey to the plains of Khotan, visiting Ilchí and fixing its position. He was the first European traveller who had penetrated so far beyond our frontier and who returned in safety; Adolphe Schlagintweit, the first who attempted this perilous journey, having been murdered in 1857. Mr. Johnson spent a fortnight at Ilchí and was well received, and returned by the Kárákásh valley and the Kárákuram pass, arriving at Leh on the 1st December, 1865. At the time when he was led to undertake this plucky journey everything appeared propitious for its accomplishment, and I give an extract from the Official Survey Report referring to it.

"Various circumstances induced Mr. Johnson to undertake a journey to Khotan and the adjacent districts in Eastern Turkestan, which lay upwards of a hundred and fifty miles north of the frontier of Ladakh, to which the regular operations of the Kashmir Survey were restricted. While in Leh he received a letter from the Khán Bádsha of Khotan, inviting him to enter his country, and offering him all the assistance and protection in his power throughout the regions tributary to, or in alliance with, those under his rule. Several days after the receipt of this letter—from the encamping ground at the head of the Kárákásh valley—Mr. Johnson sent a reply accepting the Khán's invitation, but proposing at the same time that he should send his two sons or his Wazír to the first village on the north side of the Kiún

Lún range, to escort him thence to Khotan. The encamping ground on the Kárákásh river is at a point on the main route to Yarkand, where a road diverges eastward, across the Yangidiwán pass to Khotan: while halting here, Mr. Johnson made several excursions to the Kiún Lún range, which were pushed forward into the Khotan district, on his receiving authentic information that the Khán had despatched his Wazír to meet him at Brangsá, the first village beyond the Ladakh border, for the purpose of accompanying him to Ilchí. The Khán had also with his own pen charged his officials to make such arrangements as would facilitate Mr. Johnson's journey through his territories. He had thus an opportunity of making a tour through Khotan, at the invitation of the ruler, with every chance of succeeding in carrying out his project for the determination of the positions of Ilchí and other important places, and for the extension of topographical work north of the Kiún Lún range."

This adventurous expedition so far beyond the Kashmir frontier, although successful, could not be officially noticed and rewarded, as it would have been, had not Mr. Johnson undertaken it without leave from the Government of India. The expedition presents an example of how much valuable knowledge we might now possess of the country beyond the Himalayan chain, had the Government of India in years gone by encouraged and promoted the views of those officers of the Survey and others who were able and willing to penetrate beyond this frontier, when splendid opportunities presented themselves to advance the survey.

Soon after this expedition to Khotan, Mr. Johnson retired from the service of the Indian Government, having received an offer of employment from the Maharajah of Kashmir, and of his work since 1866 I can personally give no record. He became Governor and Joint-Commissioner of Ladakh, and we hear of him giving official and valuable aid to the different political missions which the Indian Government afterwards sent to Yarkand, notably that under Sir Douglas Forsyth. For this service, and for the additions he had made to the geographical knowledge which we possess of the country beyond the Kárákuram range, the Royal Geographical Society in 1875 presented him with a gold watch.

I was a fellow-worker with Mr. Johnson in the Kashmir mountains from 1857 to 1863, and feel sure that he must have been a valued and trusted servant of the Maharajah, and his position must have been one most difficult to fill without creating great jealousy, and, no doubt, many enemies. It has been a sad task looking back on past years and recalling thereby many who are now gone. His services have been of no ordinary kind, and I am glad now to be able to bring them to public notice as they deserve. He always showed great tact in dealing with the natives of the country, and thoroughly understood and knew how to manage them. He possessed great powers of endurance, and when I knew him was one of the most zealous, persevering, hard-workers among the sub-assistants of the Kashmir Survey party, and the successful completion of that survey to a very great extent depended on his exertions.

All who knew Mr. Johnson then will deplore his untimely end, his age being only fifty-one, and therefore with apparently many more years of usefulness before him.

Dr. J. M. Ziegler.—Our much-respected Honorary Corresponding Member Dr. Johann Melchior Ziegler, the well-known cartographer of Winterthur in Switzerland, died on the 1st of April last, in his 82nd year. He was born on the 27th of November, 1801, the only son of a prosperous merchant of Winterthur, who naturally looked forward to his adopting the same walk in life as his father, and succeeding to the family business, but the inclination of the school-boy towards mathematics and the physical sciences was so strong that after completing his

ordinary education at various schools in his native country, he was sent to the *Ecole Centrale* at Paris, to be trained for a scientific career. His course of study was cut short by the death of his father, when Ziegler, now twenty-three years of age, had to return to his native town and make an effort to stifle his private longings and to keep up the paternal business. It was a vain one, and he eventually abandoned it and devoted himself to scientific pursuits. He appears to have been led to the special study of geography by attending some of the lectures of Carl Ritter, during a visit he paid about this time to Berlin. On his return to Winterthur from this journey, he founded the cartographical establishment of Wurster and Randegger, which he conducted for many years, and which gained a wide reputation for the long series of maps of Switzerland produced under his direction. He wrote besides numerous treatises on topography, physical geography, and kindred subjects, some of which were afterwards translated into French and had a wide circulation.

Dr. Ziegler was elected a Honorary Corresponding Member of our Society at the Anniversary Meeting in 1853, where his titles to the honour was stated to be his "Atlas of St. Gall and Appenzell, and his general maps of Switzerland." For many years he paid an annual visit to London, and spent most of his time in our Map Room and Library. In his own country he was held in high esteem and filled at various times responsible offices disconnected with politics.

CORRESPONDENCE.

The Norse Colony of East Bygd in Greenland and Baron Nordenskiöld's projected Expedition.

Mr. Major has addressed the following letter to the President on the above subjects:—

51, Holland Road, Kensington, *April 7th*, 1883.

Dear Lord Aberdare,—Two communications have been recently transmitted to the Council of the Royal Geographical Society from the Foreign Office, respectively from the British Ministers at Stockholm and Copenhagen, with reference to the most interesting contemplated expedition of our illustrious Medallist Baron Nordenskjöld to Greenland at the end of next month.* In both these letters the statement is made that a leading object in this expedition is to search for traces of the two ancient Norse colonies from Iceland, which flourished in Greenland from the end of the tenth to the middle of the fifteenth century, and especially to search for the site of the easternmost colony called the Oester Bygden, or East Bygd, by far the larger and more important of the two, which Baron Nordenskjöld believes lay on the east and not on the west coast. It is not often that the antiquarian side of geography is presented to the attention of the Council, but as a mistake in this matter would cause great loss of time and toil, and as the only evidence to bear upon it is of the antiquarian kind, I think I ought to mention to your Lordship and the Council that this part of the distinguished explorer's most important project is certainly founded on a mistake. If the question were a mere matter of opinion, I should not presume to write this letter at all, and, moreover, there is no one living to whose judgment on such a subject I should more respectfully defer than to that of the learned professor himself.

* The substance of these communications was given in Geographical Notes, in the Proceedings,' *ante*, pp. 165, 231.—[Ed.]

The evidence which I propose briefly to adduce is this. In 1349 a descent was made by the Eskimo upon the West Bygd, and Ivar Bardsen, a Greenlander, who had been for many years steward or lay justiciary to the Bishop of Gardar in the East Bygd, was sent to convey succour to the sister colony. Of this occurrence he has left a record, as well as sailing directions for reaching the East Bygd, both from Bergen in Norway, and from Iceland, together with a chorography of Greenland itself. We cannot, therefore, doubt that he knew the position of the colony of which he speaks. Of course, I quote no more than is necessary. Ivar Bardsen brings us by sea to a highland in Greenland, named Hvarf, a word which means a turning-point, and is the same which in the north of Scotland has taken the shape of Cape Wrath. From this point he takes us first *eastwards*, and says that "under Hvarf lies Herjulfsnaes, and *the inhabited part of Greenland lying the most to the east, and next to Herjulfsnaes on the east* is called Skage Fjord, which is a very much frequented place." He then, by long leaps, brings us to two fjords quite uninhabited, named respectively Berefjord and Oellum Lengri, and further still to the east to an island named Karsoe, "beyond which nothing can be seen on sea or land but ice and snow." He then brings us back to his starting-point Hvarf, and thence leads us *westwards*, describing *seriatim* the different fjords and localities of the East Bygd, about whose names there is no manner of doubt, as several of them are mentioned in the Sagas and the other chorographies. And now what follows is deserving of special notice. After leading us from place to place, gradually westward to a fjord called Ericksfjord, he says, "*northwards* from Ericksfjord are two arms of the sea, named Ydrevig and Indrevig. Next, *northwards* lies Bredefjord; thence *further to the north* is Eyrarfjord and so on to Isefjord, which is the most *westerly* fjord in the East Bygd." He then says that between the East and West Bygds was a space of 12 nautical miles of entirely uninhabited coast, and finishes his chorography by saying that the West Bygd had been entirely depopulated by the Skrellings.

Now it is plain that this series of places running westwards from Hvarf cannot possibly be on the east coast, for let us place Hvarf on that coast wherever we may, every step we then take to the west leads us more and more to the south, while Ivar Bardsen makes the last-named places in the series go more and more to the north. On the west coast, of course, the case is exactly reversed. It follows, therefore, that Hvarf is either Cape Farewell, or some headland near it, for if the series of places *eastwards* from Hvarf brings us to where "one can go no further for the ice and snow" which are characteristics of the north, and if the series of names *westwards* terminates also with places more and yet more to the north, it stands to reason that Hvarf itself must be a point at the south between the two and, consequently, the East Bygd, by Ivar Bardsen's showing, must of necessity have lain to the west of the southern point of Greenland.

Although neither of these lines of thought seems ever to have occurred to any commentator for the last three centuries, they are, I trust, not the less conclusive for all that.

Sir Horace Rumbold in his letter says that "Professor Nordenskjöld's resolution to visit Greenland was, no doubt, in part awakened by the discovery he made of a MS. map of the northern countries of Europe (preserved in the Library of Nancy, and of which he has just published a facsimile), made at Rome in 1427, sixty-five years before the first voyage of Columbus. This most curious map, the earliest known of its kind, contains an outline of the coast of Greenland almost accurate as to geographical position, and clearly marked as Gronlandia Provincia." So intensely interesting a date as this excited my curiosity to the highest pitch, but I met with great disappointment. The map is from a MS. Ptolemy, and exhibits only a festooned imaginary suggestion of a part of the east coast of Greenland with the legend

"Gronlandia Provincia," but without the name of one single place upon it, whereas the Zeno map which is a whole century earlier than the first voyage of Columbus across the Atlantic, shows the entire coast of Greenland east and west, with an accuracy most astonishing in a map 500 years old, and contains a considerable number of names indicating exploration and actual geographical knowledge. Among these occurs "Af promontorium," answering to "Hvarf," in exactly the southern position which I have already described.

It will be extremely interesting if our honoured medallist should come upon the traces of an extinct volcano, which certainly was in activity at the time of the Zeni, for not only does Niccolo Zeno say that he found a monastery hard by a hill which vomited fire like Vesuvius and Etna, but his brother Antonio relates how he and Earl Sinclair at a later period descried from the southern point of Greenland a mountain in the distance which poured forth smoke, and which was verified as a volcano by a party of a hundred men sent out by him, and who returned after eight days' absence.

R. H. Major.

REPORT OF THE EVENING MEETINGS, SESSION 1882–3.

Ninth Meeting, 9th April, 1883.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*The Rev. Adam Currie; C. Campbell Downes, Esq.; Edwin Fox, Esq.; Louis F. Gowans, Esq.; Henry Harper, Esq.; Edward Arthur Hughes, Esq.; Ewart Jukes, Esq.; The Marquis of Lansdowne; Arthur Moser, Esq.; Athelstan Riley, Esq.*, B.A.; *Hon. Donald A. Smith; Oliver Roper Strickland, Esq.; Dr. A. Boyle Thompson; W. Birkinshaw Wilkinson, Esq.; Major John Wilson.*

The paper of the evening was—

"The Basins of the Amaru-mayu and the Beni, with the recent Exploration of the latter by Dr. Edwin R. Heath." By C. R. Markham, C.B., F.R.S., Secretary R.G.S.

To be published in the June No. of the 'Proceedings.'

Tenth Meeting, 23rd April, 1883.—The Right Hon. Lord Aberdare, President, in the Chair.

Presentation.—*D. G. F. Macdonald, Esq.*

Elections.—*J. M. Barbour, Esq.; Arthur Hugh Smith Barry, Esq.; H. G. Erichson, Esq.; Francis George Gunnis, Esq.; Major William George Remfrey Herd; Fung Yih (Secretary to the Chinese Embassy); Thomas Hastings Lees, Esq.; Edward Ledwick Mitford, Esq.; Charles G. Nottage, Esq.; The Rev. Alfred Roebuck; William S. Routledge, Esq.*, B.A.; *Trelawney Saunders, Esq.; The Rev. F. A. Stewart Savile; John Medley Stewart, Esq.*

The President announced that the Royal Medals and other awards for the year 1883 had that day been adjudicated by the Council. They were as follows:—

The Founder's Medal to Sir Joseph Dalton Hooker, F.R.S., for his eminent services to Scientific Geography, extending through a long series of years and over a large portion of the globe, while engaged in voyages in the Antarctic and Australian Seas, and journeys in India and the Himalaya, in Morocco, and in the United States

of America; and more especially for his long-continued researches in Botanical Geography, which have thrown light on the form of the land in pre-historic times, and on the causes of the present distribution of the various forms of vegetable life on the earth.

The Patron's Medal to E. Colborne Baber, Chinese Secretary to H.B.M. Legation, Peking, in recognition of the great value of his scientific work, chiefly geographical, during many exploratory journeys in the interior of China; and for his Reports of these journeys, drawn up with admirable skill, accuracy, and completeness, which he presented to the Society, and which have been published, together with route maps engraved from his own finished drawings, in the first part of the "Supplementary Papers."

The Murchison Grant for 1883 to Wm. Deans Cowan for his extensive surveys in the Tanala, Betsileo, and Bara Provinces of Central Madagascar, an account of which was read by him to the Society in June 1882, and published in the September No. of the 'Proceedings' of the same year. Also as an encouragement to him in the new journey of exploration he is about to undertake in Western Madagascar.

The Back Grant for 1883 to L'Abbé Petitot, for his geographical and ethnographical researches in the region of the great lakes of the Arctic basin, between Great Slave Lake and the Polar Sea, and his Map of the Basin of the Mackenzie.

The Cuthbert Peek Grant for 1883 to F. C. Selous in acknowledgment of the value of his Geographical researches in South Central Africa, including a journey in 1877 through the Manica country, north of the Zambesi, published with a map in our 'Proceedings' (1881, p. 169), an examination of the hydrographical system of the Chobe ('Proceedings,' 1881, p. 71), and two journeys by previously untrodden routes through Mashona-land ('Proceedings,' 1881, p. 352, and 1883, May No.), carefully prepared maps of which he communicated to the Society. Also as an encouragement to him in the further researches in geography and natural history he has undertaken in the same region.

The following Honorary Corresponding Members had also been elected:—

Duca di Sermoneta (Prince Teano), President of the Italian Geographical Society, and of the International Geographical Congress at Venice, 1881.

Dr. Schweinfurth, the eminent African traveller; now resident at Cairo.

Edwin R. Heath, M.D., the explorer of the Beni river, South America; now resident at Wyandotte, Kansas, United States.

The following paper was then read:

"China, in its Physical and Social Aspects." By E. Colborne Baber, Esq., Chinese Secretary to H.M.'s Legation, Peking.

Will be published in a subsequent No. of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—April 6th, 1883: M. Bouquet de la Grye, Vice-President of the Central Commission, in the Chair.—The Minister of Public Works transmitted the hydrological map of the Department of the Seine, in 4 sheets, new edition, by the late M. Delesse, mining engineer.—At Brussels a National Institute of Geography has just been established, which announced to the Society its formation. The object of this private institution is to popularise the study of geography by the publication of Atlases, maps, and works relating to Belgium. It proposes to revive in the country a national industry which formerly enjoyed great prosperity. The Institute further undertakes the printing and publication of

all geographical works, as well as the buying and selling of instruments and apparatus connected with geography.—The "Société des Touristes du Dauphiné," which has been in existence since 1875, announced that it had just established a section at Paris, called the "Paris Section," the object of which is to make the public of the capital acquainted with the picturesque mountains of the province of Dauphiny, which are still so little known, and to gather together the friends interested in the Alps and in geography. The Society has already constructed châlets, refuges, and shelters in the Dauphinese Alps; it has engaged guides, whom it has furnished with ropes and alpenstocks—all these operations have involved an expenditure of more than 800*l.* (20,000 francs).—From Vienna (Austria) the Society was informed that a bequest had been made to the Imperial Academy of Sciences of that city by M. Boné. This legacy consists of a house worth 6000*l.* (150,000 francs), and the income derived therefrom is to be devoted to the support of travellers in Turkey.—News, dated from Bafulabé (Upper Senegal) 19th February, was received from Dr. Bayol, in which he states that the events of Kaarta will probably put an end to his scientific mission sooner than he expected. However, having started from Bafulabé on the 15th of January, he had already traversed eastern Khasso and Tomara, collecting interesting information and making collections, which will be placed in the Paris Natural History Museum. He had surveyed 44 miles of very mountainous country, which up to the present time was unexplored. In the collections which he will bring back with him, there are forty-five wood-essences; he has, moreover, discovered a forest of ebony-trees in Senegal, which is not less than six miles in extent. He has collected the leaves of a tree from which a colouring principle can be extracted which stands the test of washing most satisfactorily. His ornithological collection consists of 150 birds. In his mineralogical collection there is a metalliferous rock, on the subject of which he does not venture to pronounce an opinion; this piece of rock, which he found in the bed of a great river not yet described, viz. the Ganboma (or Garboma), contains a white metal.—A letter was received from M. Ernest Desjardins of the Institute (Academy of Inscriptions and Literature) on the subject of the ancient town of Zama, the site of which has just been discovered at Si Amor Djedidi,—this latter place being situate on the north-west of the great plain of Kairwan (Tunis), and on the south-east of Kef. M. Letaille, who is engaged in a scientific mission in Tunis, has sent an inscription, which he has just met with, and on it there is represented a municipal magistrate of the "Colonia Zamensis." This inscription is certain to have been commented upon by M. Desjardins at the recent meetings of the Academy.—The Society had its attention again drawn to ancient geography by a communication from M. Romanet du Caillaud, relative to certain passages in the 'Geography' of Edrisi. The point at issue is the identification of several French towns, which Arabian geography has designated under the names of Morlans, Burgoch, and Ach. The writer identifies the first of these localities with Morlaas, the ancient capital of Béarn (and not with Montauban, as has been believed up to the present time); the second with Perigueux; and the third with the ancient Agedunum (Ahun) in the Haute-Marne.—The Society was informed of the principal subjects of a lecture delivered recently at the Italian Geographical Society at Rome by M. Lovisato, fellow-traveller with Lieutenant Bove. The lecture was concerned chiefly with the geographical observations and discoveries made by him at Tierra del Fuego in Patagonia and in the Pampas. The lecturer dwelt at great length on Staten Island, where he has made important surveys. He has given Italian names to the mountains, bays, straits, and glaciers, which had not borne any name before. M. Lovisato has expressed the opinion that in the Antarctic region there exists not a sea but a continent.—A short paper was read on Le-suto, or the country of the Ba-sutos

(South Africa), the paper being a supplement to a map prepared by M. C. Krüger. Copies of this map, which is only an experiment, engraved under the auspices of the Society, were distributed among the audience. This map, which is the most complete map published before 1882 (Hall's map excepted), is the only one which gives an at all accurate configuration of the country. Thus, for example, all anterior maps place the frontier north of Le-suto, and therefore that of the Free State immediately to the north of Thaba Bossigo; and they give to the Orange Republic all the country of the sources, which is, so to speak, the natural base of Le-suto. The account which accompanies the map, prepared by M. Krüger, has been written by Pastor Appia and by M. Jousse, French Protestant missionary, who has resided in the country thirty-two years, and has only just left his apostolic ministry. Le-suto is situate between the 28th and 31st parallels of S. latitude. The population (137,000 souls) is very peaceable; the natives are industrious and therefore much sought after in Cape Colony; they exercise a great influence on the neighbouring tribes. The social and moral development of the country is very remarkable. The French mission has introduced into the country the cultivation of wheat, maize, grapes, and potatoes; to-day the fruits of the orchard can be gathered there, apricots, peaches, apples, figs, pears, cherries, &c., and all the agricultural products of the south of France.—M. Jousse, who was present at the meeting, spoke in confirmation of the information he himself had furnished in the above paper. He dwelt chiefly on the education which is given in the schools of the country, and of the degree of civilisation which the natives have attained. The same missionary presented to the Bureau a large map of the country of the Namaquas, for the library of the society.—M. Louis Simonin then entertained the Society with some information upon the four ports of Great Britain, viz. London, Liverpool, Glasgow, and Newcastle, describing the continued development of each. M. Simonin is the author of a work published under this same title: 'Les Ports de la Grande Bretagne' (Paris: Hachette, 12mo.), but, as he said, the progress of these four merchant ports has been so rapid during recent years, that the information contained in the above-mentioned work is already very much out of date.—In conclusion a communication from M. Carl Bock on his journey to the north of Bangkok and Laos (Siam) was read. A map, giving a sketch of the route of the traveller from Raheng to Xien-Sen, was handed round during the meeting.

Société Khédiviale de Géographie, Cairo.—February 16th, 1883.—M. Mosionas, who is engaged in studying Egyptian archæology, and who has resided for many years in the Egyptian Soudan, read a paper of great interest on the Hadéndoas, in which he maintained that he had found evident traces in this tribe of the language, the manners, the beliefs, and the customs of ancient Egypt. He instanced many words in support of his views and announced that he had drawn up a short vocabulary and a number of facts: the ethnographical type also, he maintained, showed that the Hadéndoas were the ancestors of the Egyptians, and he invited the Government to give encouragement to studies on this subject.—A communication was read from Mason Bey, on the railways of the Soudan. The reading was preceded by a note of M. Bonola, the general secretary, on all the proposals and projects that had been submitted to the Egyptian Government relative to railways. Mason Bey believes that from Wady Halfa a railway line might be traced to Ammara and that from there the river could be navigated to Meraveri, if the difficult points were turned by tramways. As to the eastern line, he proposes a route for the railway, not from Suakim to Berber, but from Tokar by the Khor Barka to Kassala, and from there to Khartum or Abu Harras. This route would have the advantage of running through a cultivated and fertile country.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

ASIA.

Bird, Isabella L. (Mrs. Bishop).—The Golden Chersonese and the Way thither. London (John Murray): 1883, crown 8vo., pp. xvi. and 384, map, illustrations. Price 14*s.*

The authoress commences with a description of the incidents of her journey from Japan to Hongkong, Canton, and up the Mekong to Saigon (where during her short stay she visited the native town of Cholen). According to her informants, Europeans cannot be acclimatised in French Cochin China, and most of the children born of white parents die shortly after birth; the shores of the sea and rivers are scourged by severe intermittent fevers, and the whole of the colony by dysentery, which is particularly fatal among Europeans; the mean temperature is 83° Fahr., the dampness unusual, and the nights too hot to refresh after the heat of the day. Rice forms half the exports; and about 700 vessels enter and leave Saigon in a year.

She then describes her experiences in the Straits Settlements, beginning with Singapore, from which capital she visited Malacca (to all intents and purposes a Dutch town) and the protected little native state of Sungei-Ujong, which has 12,000 inhabitants, of whom three only are Europeans. An interesting short account is given of the chief characteristics of this State, in which the thermometer ranges from 68° to 92°, and the rainfall averages 100 inches per annum. She ascended the tortuous Linggi river for some 60 miles till it was a mere jungle path, to Rassa and the British Residency at Serambang, staying there some days and returning to Malacca. A compiled chapter on Selangor follows (mostly from Mr. Daly's paper in the R.G.S. 'Proceedings' for July last), with narrative of a visit to the British Residency, then at Klang, but now removed to Kwala Lumpor, the centre of the tin-mining industry. From that point she sailed in Sultan Abdulsamat's yacht down the Klang river, up the Langat, and among the islands of the coast, visiting the Sultan himself; and after returning to Klang ascended the Bernam river to Selangor (a wretched place, worse even than Klang). In the same vessel she then reached the Dindings and Pinang, which she describes with special reference to Georgetown and its environs. A chapter on Perak ("Payrah") is given, with short notice of Province Wellesley and an account of a journey to Larut, where some stay was made, after which the authoress went to the British Residency at Kwala Kangsa, at the junction of the Kangsa and Perak rivers, 150 miles from the mouth of the latter, and also to the British Residency at Taipeng, returning to Pinang.

The map shows the Malay Peninsula with Perak on a larger scale; and the sixteen plates represent native buildings, scenery, plants, &c.

Colquhoun, Archibald R.—Across Chrysê, being the Narrative of a Journey of Exploration through the South China Border Lands from Canton to Mandalay. London (Sampson Low & Co.): 1883, 2 vols., 8vo., pp. xxx. and 420, xvi. and 408, maps, illustrations. Price 2*l.* 2*s.*

The main features of the author's journey were given by him in our 'Proceedings' for last December (pp. 713–730), and he now supplies the details of his personal observations on the Canton river to Pe-se, and thence on his road through Southern Yunnan to Ssu-mao or Esmok on the boundary of the independent Shan States (where he was obliged to abandon the most important portion of his object), and northwards up the Papien valley to Tali, where he struck westwards across the Chinese frontier to Bhamo, which is described at the end of vol. ii., the crossing of Chrysê or Indo-China being summarised in the last chapter. It is impossible here (especially as Mr. Colquhoun's book is published almost simultaneously with the present Number) to give a sufficient idea of the extent and value of his observations; but some conception of them

may be formed from the number and the trustworthy sources of the accompanying illustrations. These, amounting to 270 (many of them full page), are either from original photographs, or from sketches by the author or his deceased companion, Mr. Charles Wahab; and they represent objects of interest of the most varied kind, including distinctive features of physical geography, landscapes of very considerable beauty, ancient and modern buildings, racial types, town and rural customs and industries, costumes, implements, &c., which, especially when referring to the practically before unknown parts of Southern Yunnan, cannot fail to be of permanent interest. When it is understood that the narrative to which these are adjuncts was absolutely written on the spot, its value on the score of freshness and accuracy will be evident.

The first half of vol. i. is occupied with the incidents of the voyage up the Canton river to the eastern frontier of Yunnan, and the plotting of the survey of this portion was actually finished during the journey, the remainder (to Tali) still awaiting completion, when the whole will be submitted to the Royal Geographical Society. The remainder of this volume takes the reader to Linan.

Vol. ii. commences with the journey from Linan across the Song-ka by Yuan-kiang, Talan, and Puerh to Ssu-mao, at which point further progress in the desired direction was checked, within twenty-five days march of Zimmé, by the defection of an interpreter and the hindrances thrown in his way by the resident mandarin. Mr. Colquhoun's object being to ascertain the commercial aspects of the Shan country as well as those of South-Western China, this abrupt stop on the threshold of success is particularly to be regretted; he gives, however, in chapters xvii. and xviii. of this volume a very full and able discussion of the question of trade extension with the north of Siam, the Shan States, and Yunnan, in the course of which he demonstrates that the best practical connection should be by railroad. Any railway passing from west to east, north of lat. 17° 50′, is considered to be impracticable; but a railway from Rangoon to Kian-hung is proposed, and deemed to be not only practicable but likely to meet with fewer and less difficult obstacles than have hitherto been expected. This is sketched at pp. 233 and 234 of vol. ii., and is well shown on a large special map (scale 33 miles to the inch). The remainder of the volume (which includes a very interesting account of the Lolo hill people) is taken up by the journey northwards to Tali and the return home by Rangoon.

A translation of a manuscript account of the Kwei-Chau Miao-Tzŭ, written after the subjugation of the Miao-Tzŭ about 1730, is given as an Appendix by Mr. George W. Clarke of the China Inland Mission; and a copious Index completes the work.

The maps are (1) General South Asia, showing the author's route and the proposed rail; (2) Southern China and Indo-China, from the December number of our 1882 'Proceedings'; and (3) the large proposed extension of the British Burma Railway system above noticed; besides various small chartographic diagrams in the text.

Cotteau, Edmond.—De Paris au Japon, à travers la Sibérie. Paris (Hachette): 1883, 12mo., pp. 450 [no index], maps, illustrations. (*Williams & Norgate*: price 3*s.* 6*d.*)

The author's voyage was made between May and August 1881, in execution of a mission with which he was charged by the French Minister of Public Instruction. His route was by Kazan, Tobolsk, Samarova, along the Ob to Tomsk, Krasnoyarsk and Irkutsk, and is shown on a general map: two smaller maps represent (p. 336) the curiously recurved plexus of the Amur between Albazin and Blagovestchensk, and (p. 393) the confluence of the Sungatcha and Ussuri. The numerous illustrations represent natural scenery, towns, tribal types, &c.

De la Croix, J. Errington.—Les Mines d'Etain de Pérak (Presqu'île de Malacca). Paris (Dunod): 1882, 8vo., pp. 78, maps, plates.

This treatise, just received in the Library from the author (a separate publication extracted from vol. ix. of the third series of the 'Archives des Missions

Scientifiques et Littéraires'), may be referred to in connection with Miss Bird's work above noticed, in spite of its purely mineralogical and commercial aim. M. De la Croix, a civil engineer, intrusted (in company with M. Brau de Saint-Pol Lias) with a special scientific mission in Malaya by the French Minister of Public Instruction, here gives an account of the result of his personal examination of the stanniferous workings in Perak, describing briefly the geography, topography, and geology of the region, in addition to details of mining operations. His routes are shown on two maps, one of the State of Perak with sectional profiles (scale 1:1,500,000), the other of the Larut province (scale 1:200,000). A geological map of sections is also given, with various technical plates and views of Taipeng, Gounong Pondok, and the mines of Kong-Loon.

Haeckel, Ernst.—A Visit to Ceylon. Translated by Clara Bell. London (Kegan Paul, Trench & Co.): 1883, 8vo., pp. viii. & 337 [no index]. Price 7*s.* 6*d.*

A translation of the original German work briefly noticed in our 'Proceedings' for last January, p. 49. The details of the author's stay at Belligam and his observations on the hill country (Newera Ellia is accidentally stated to be "only seventy," instead of seven, degrees north of the Equator) are of especial interest: and the whole book cannot fail to impress itself on home readers as a vivid description of a tropical country and its products by a thoroughly scientific observer who (after nearly thirty years of study) has at last made the personal acquaintance of his subject under natural conditions.

Javorsky, [Dr.] I. L.—Puteshestviye Russkago Posolstva po Afghanistana i Bukharskomu Khanstvu v 1878–1879 [Travels of the Russian Mission in Afghanistan and the Khanate of Bokhara in 1878–1879]. St. Petersburg (Khana): 1882 & 1883, 2 vols., 8vo., pp. 383 & 387 [no index], maps and illustrations. Price 5 roubles (16*s.* 8*d.*).

Mr. E. Delmar Morgan has supplied an analysis of this work, which, though late in appearance, is an important contribution to Central Asian literature, especially in its political aspects. The account which it contains of the Russian Mission to Kabul under General Stolétof is from the diary of Dr. Javorsky, who accompanied the expedition as physician, joining it at Samarkand (approached by 20 miles of well-metalled road). He incidentally refers to the great undertaking, commenced at the time of his journey, of diverting part of the Syr Daria by canal, to irrigate the steppe—a work which, if successful, would restore life and population to some 10,000 square versts of desert, and for which he considers water could be spared without lessening the navigability of the river.

Starting on June 2/14, 1878, the mission left Samarkand in the direction of Djam (2050 feet above sea-level), now a mere hamlet, and soon passed the Russian boundary pillar. In consequence of a pressing invitation from the son of the Ameer of Bokhara, a circuit of 25 miles in a south-east direction was here made to Chirakchi, reached by a long day's march over undulating desert, with the range of the Samarkand hills on the left, which here turn abruptly south, and only throw out some insignificant offshoots to the west. Chirakchi was entered after crossing the Kashka Daria, and the reception here and through all the Bokharan territory was very friendly, the chiefs being compared, both from their dress and manners, with the Russian nobles of the period before Peter the Great.

Resuming the journey, the mission struck south-east from Kushi to Guzar, entering the mountains by the Ak-dagan (white pass) defile, and following a stream of the same name to its source at the village of Chashma-i-Hafizan (3540 feet), on the next day (11/23 June) coming to the celebrated Iron Gates, through which, in modern days, Maief, Petrof, and Schwartz were the first to pass (1875). This is an oval-shaped opening in the mountains, two miles long, nearly closed at each end by precipitous walls of rock, through which the Shirabad Daria has forced its way. Its local name, Nan-dagan (bread pass), is given to it from its resemblance in shape to one of the loaves of the country. The citadel of Shir-abad (Lion's Home), at the further end of the pass, is of great natural strength, on a precipitous rock 140 feet high, only approachable from

the south, where entrance is barred by two thick walls. From this place (which has been dubiously identified as Mokanna's fortress of Sam), two roads lead to the Amu-Daria, one by Patta-Guzar, the other by Chushka-Guzar, 20 or 30 miles lower down the stream. The mission chose the latter, finding the river upwards of a mile in breadth, and studded with numerous low-lying islands covered with reeds. Its waters deposited a thick sediment, and as the banks were low the adjacent country was partially flooded, quantities of decayed vegetation being thrown up, producing unhealthy miasma, and attracting swarms of gnats as troublesome as mosquitoes. The river-crossing is still effected in clumsy and primitive boats called kayuks, dragged through the water by untrained horses, as described by Burnes forty-five years ago. A similar kind of ferry was observed by Mr. Morgan in 1880 to be employed in crossing the deep, wide, and rapid river Ili near Kulja. When landed on the Afghan side of the Amu-Daria, the mission party, attended by an escort of Kazareh horsemen, entered a country remarkable for its silk production, and in which peaches and apricots were found to ripen as early as the 18/30 June. Near Karshiak (last visited by Moorcroft in 1824), half-way between the river and Mazar-i-Sherrif, a populous and well-cultivated place, extensive ruins were seen, concerning which no local tradition survives. Mazar-i-Sherrif itself, the capital of Afghan Turkistan, was entered on 23rd June—5th July, and, though received in triumph, the Russian party had to remain secluded here for a fortnight, pending the return of their messenger from Kabul, several of the members being in the meantime prostrated by fever. Dr. Javorsky here breaks off his narrative to describe the geography of the Oxus valley, and mention the earlier travellers in Afghan Turkistan.

The resumed road to Kabul led due east through Naib-abad and Tash-Kurgan near the ruins of Khulm, depopulated in 1822 by Murad Beg, and of which only a few inhabitants and some houses remain. It is practically the same as that roughly described in Ferrier's 'Caravan Journeys' and Burnes's 'Travels into Bokhara,' though the former turned off to Herat from Khurrem (Korram). According to Dr. Javorsky, Burnes's descriptions are very inaccurate; thus he speaks of the gorge of Heibak as walled in by cliffs from 2000 to 3000 feet high, excluding the sunlight. These rocks, according to Javorsky, are not over 500 feet high, and the north and south position of the defile renders it impossible that the sun should be excluded. The name Dereh-i-Ziudan or "Dungeon Valley" borne by this defile, is not derived as Burnes supposed, from its own physical conditions, but from some caves about three miles to the south near the village of Akam, formerly used as prisons.

Another remarkable defile is that of Rui, through which the mission passed, a narrow chasm affording barely room for the passage of a single horseman, and most impressive from its darkness and silence. Two other passes, the Kizil Kotul and Kara Kotul (10,500 feet according to Burnes) were crossed on the 16/28 July, the descent from the latter into the beautiful and fertile Madur valley being particularly long and difficult.

At Kamard the party was met by the governor of Bamian, who accompanied and entertained the Russians while they travelled in his territory. The ascent of Dendan-Shikan ("The Tooth-breaker") was then commenced, the path being a mere slippery trough in slaty rocks, zigzagging up the side of the cliff with a sheer precipice on one side. The summit (according to Burslem, 9000 feet high) commands a boundless view over mountains rugged and bare of verdure, and is half-way beween Tash-Kurgan and Kabul. Four miles of plateau have to be traversed before the descent on the southern side is commenced by the Saigan valley; and most English maps are wrong in rendering the ascent and descent forming the whole pass as two separate passes. The local name of the pass is Desht-i-Gashak, according to the author. The route now led through Rigi-nan (the Nine Sands) and Ak-robat (White Caravanserai) where a road branches off to Herat; and the author then devotes a chapter to the celebrated Bamian Pass, with its idols, caves, and ruins, agreeing in the main with the description by Burnes.

After the arrival at Kabul, the narrative becomes so exclusively of political interest, that practically the second volume of the work requires no notice here.

The illustrations consist of portraits of Shere Ali and Sayid Mozafar Khan, (Ameer of Bokhara), and representations of the Bamian stone idols. The map, by the topographic officer, N. A. Bendersky, who accompanied the mission, shows the region of the head-waters of the Amu-Daria (scale 1 : 4,000,000), with the route of the mission separately on a much larger scale.

Kuropatkin [Col.], A. N.—Kashgaria: [Eastern or Chinese Turkistan.] Historical and Geographical Sketch of the Country, its Military Strength, Industries, and Trade. Translated from the Russian by Walter E. Gowan, Major, H.M.'s Indian Army. Calcutta (Thacker, Spink, & Co.), London (W. Thacker & Co.): 1882, 8vo., pp. 255.

Although without the eight appendices (over 200 pages long) of the original work, containing itineraries, tables of distances, trade returns, astronomical positions, &c., this translation of Colonel Kuropatkin's account of his mission to Yakoob Beg (from May 1876 to April 1877), and of the geography, history, and political and domestic economy of Kashgaria, will be found of much value to those unacquainted with the Russian language. The question of capabilities of trade and the incidents of the rebellion against China resulting in the occupation of the country by the Chinese, are discussed with considerable detail.

Palestine Survey.—The Survey of Western Palestine. Memoirs of the Topography, Orography, Hydrography, and Archæology. By Capt. C. R. Conder, R.E., and Capt. H. H. Kitchener, R.E. Volume III. Sheets xvii.–xxvi. Judæa. Edited with additions by E. H. Palmer, M.A., and Walter Besant, M.A., for the Committee of the Palestine Exploration Fund, 1 Adam Street, Adelphi, London, W.C., 1883, 4to., pp. vii. and 450, illustrations.

This volume, entirely edited by Mr. Besant, owing to the illness and subsequent tragical death of his colleague, the late Professor Palmer, completes the series of the "Memoirs" to accompany the map of the Survey of Western Palestine, with the exception of the Index, which is being prepared. The illustrations have, with a few exceptions, been taken from drawings on the spot, and Captain Conder has revisited many of the sites with the proofs of this concluding portion of the work in his hand. It may here be noticed that vol. i. (sheets i.–vi. of the map), Galilee, pp. 420, was published in 1881; vol. ii. (sheets vii.–xvi.), Samaria, pp. 445, in 1882; and that the price of the three volumes will be 9*l.* 9*s.*, should any copies remain after the whole sets of Memoirs, &c., are supplied to subscribers.

In the discussion of the different sheets of the map, the subjects of Orography, Hydrography, Topography, Biblical and non-Biblical sites, Roads, and Archæology are separately treated in order, with alphabetical sub-arrangement of detail; and there are upwards of 90 illustrations (including smaller maps and plans), many of which are of geographical interest, so that independently of the special object of the Survey, these memoirs form by themselves a very important contribution to the geography of Western Palestine.

Ross, David.—The Land of Five Rivers and Sindh. Sketches Historical and Descriptive. London (Chapman & Hall, Limited): 1883, 8vo., pp. 322, map. Price 12*s.*

The author's aim is to furnish travellers with a short historical and descriptive account of the country and places of interest between Karachi, Multan, Lahore, Peshawar, and Delhi, his remarks being mainly confined to the more prominent cities and towns adjoining the railway system, and being in nearly all cases based upon personal observation. Objects of antiquarian interest, and the principal arts and manufactures in the different localities are briefly noticed, and some reference is made to the independent adjoining States and the North-Western Provinces, with outlines of routes to Kashmir, the various hill sanitaria, and marches in the interior of the Western Himalaya, the book as a whole being practically supplementary to the Guide for Bombay by Eastwick.

The map (50 miles to the inch) contains little more than the names of the stations on the railways.

Saint-Pol Lias, Brau de.—Pérak et les Orangs-Sakèys. Voyage dans l'intérieur de la Presqu'île Malaise. Paris (Plon): 1883, 12mo., pp. 302 [no index], map, plates. (*Dulau*: price 4*s*.)

A reference to the treatise of M. De la Croix, above noticed, will sufficiently explain this little work, which is of a more popular nature. A dozen illustrations of topographical, botanical, and ethnological subjects are given, and the map covers the same area as the general one in M. De la Croix's book (scale 1 : 1,210,000), with insets of the author's excursion in Perak (scale 1 : 484,000), of the Straits of Malacca, and of the general route to the Malay Peninsula from Europe.

AFRICA.

Rohlfs, Gerhard.—Meine Mission nach Abessinien. Auf Befehl Sr. Maj. des Deutschen Kaisers im Winter 1880–81 unternommen von Gerhard Rohlfs. Leipzig (Brockhaus): 1883, 8vo., pp. xx. and 348, map, plates. (*Williams & Norgate*: price 12*s*.)

The author, accompanied by Dr. Stecker, a well-known German naturalist, undertook a journey to Abyssinia in the winter of 1880, by order of the German Emperor. Landing at Massowa, he struck across to Kasen, in the highlands of Hamasen, and thence travelled south to Adowa, Fenaroa, and Sokota, from which he went south-west to Debra-Tabor, finally reaching the Tana Lake about the middle of February 1881. His companion travelled round the Lake and then rejoined him, the road home being by Gondar, and thence north-east to Aksum and Adowa. As the work will probably be translated into English, it is unnecessary here to do more than indicate the route of the author, who has made the most of his opportunities in describing and figuring the peculiar physical formations of the country traversed by him, the numerous architectural remains, objects of ethnological and artistic interest, special vegetation, &c.

The map (scale 1 : 1,300,000) is by Hassenstein, and has already appeared in Petermann's 'Mittheilungen' for last year.

AMERICA.

Hatton, Joseph, and Harvey [the Rev.] M.—Newfoundland: the oldest British Colony. Its History, its present Condition, and its Prospects in the future. London (Chapman and Hall, Limited): 1883, 8vo., pp. xxiv. & 489, illustrations. Price 18*s*.

Mr. Harvey who has resided in the island for a quarter of a century and made an especial study of its natural history during his numerous explorations, has supplied the local particulars—Mr. Hatton being responsible for the literary portion. After an historical account, Part 2 is devoted to the physical geography and topography in which the situation, mountains and rivers, bays and harbours, interior, geology, climate, aborigines, fauna and flora, are separately discussed. Special parts are also given to the fisheries, the agricultural and mineral resources, and the political and domestic institutions, &c., of the colony. The Reports of the Geological Survey and other available authorities are utilised; but the volume is properly stated to be only a pioneer.

Macoun, John.—Manitoba and the Great North-West: The Field for Investment. The Home of the Emigrant. London (Thos. C. Jack): 1883, 8vo., pp. xxii. & 687 [no index], maps, illustrations. Price 12*s*.

The author ("Dominion Government Explorer of the North-West") accompanied Mr. Sandford Fleming as botanist on his journey across the continent in 1872, and in 1875 was appointed in the same capacity under Prof. Selwyn on his explorations of the Peace River and Rocky Mountains. Since that time, he has been occupied in collecting material for a report on the North-West Territories, and he has now published the results of his own observations, supplemented by trustworthy statistics and information derived from various authorities. He describes separately the general geography of the Dominion; the physical geography of Manitoba; the character of the country between lat. 49° and 50°, 50° and 51°, 51° and 52°, and 52° and 53°, west of Manitoba;

the country drained by the North Saskatchewan and Athabasca; the Peace River; the climate of the north-west (with practical remarks); the natural products of the soil (with special chapters on wheat, cereals, &c., grasses, stock-raising, &c.); the supplies of water, fuel, and timber; the fauna, minerals, and Indians; with much historical and statistical matter, and details likely to be of use to settlers.

The maps, &c., are prepared by the Dominion Government.

Pereira, Ricardo S. — Les États-Unis de Colombie. Précis d'Histoire et de Géographie Physique, Politique, et Commerciale, contenant un grand nombre de Renseignements utiles aux Voyageurs et aux Négociants, de courtes Notices Biographiques des Personnages célèbres de la Colombie, &c. Paris (Marpon & Flammarion): 1883, 8vo., pp. viii. and 311 [no index], maps. (*Dulau*: price 7*s.* 6*d.*)

After an introductory historical sketch, the author (Secretary of Legation, and official delegate to the third International Geographical Congress) describes the physical geography of the United States of Colombia as a whole, with a separate account of each of the States, viz. Antioquia, Bolivar, Boyaca, Cauca, Cundinamarca, Magdalena, Panama, Santander, and Tolima. In each case, the situation, limits, area, general aspects, population, history, social and political condition, agricultural, industrial, and commercial pursuits, roads and means of transport, natural attractions, and administrative divisions are discussed; with a dictionary of the separate communes, a table of population, and a separate map. A general coloured map of the whole States is also given.

A special part is devoted to statistics, and the work concludes with biographical and bibliographical notices, the former arranged chronologically and the latter (roughly) by subjects.

Raimondi, Antonio.—El Perú. Tomo III. Historia de la Geografía dël Perú. Libro II. Lima (J. Enrique del Campo): 1880 [on cover, 1879 on title], sm. fo., pp. 614, maps and plates.

Although apparently too remote in date to be properly considered a new book, this volume of our honorary corresponding member Don Antonio Raimondi's great work has (presumably in consequence of the cessation of all scientific progress in Peru during the Chilian occupation of the capital) only recently arrived in England; and it is from a private copy received by Mr. C. R. Markham, that the present notice is enabled to be given. It is reported that the 4th volume, which was actually being printed and practically ready for publication, has been destroyed (with other valuable and purely historical material) by the invaders; so that the present would seem a fitting opportunity for reference to the hitherto published parts of the work, of which the preliminary volumes appeared before the present scheme of our 'Proceedings' admitted bibliographical matter.

In the preparation of this descriptive account of the Geography, Geology, and Natural History of Peru, the author has systematically explored every part of his adopted country, to the service of which he has devoted some 30 years; and a national character was given to his undertaking by a Resolution of Congress in January 1869, authorising its publication at the expense of the Republic.

Volume I., "Parte Preliminar," pp. 444, appeared in 1874, and consisted of two parts; of these Libro I. contains an account of the author's studies in Peru, with a short relation of the works of his predecessors, and a discussion of the plan intended to be followed and of the best means for its future useful continuation. A special chapter in this section is devoted to details of the fittest methods of travel in Peru for scientific purposes. This part shows that material had been collected sufficient for six distinct divisions of the whole work, viz. Geography, Geology, Mineralogy, Botany, Zoology, and Ethnology, in addition to the introductory matter, and to be illustrated by various maps and plates. Of these, it is to be feared that the portions of the Geography to be now noticed are all that will ever see the light.

Libro II. contains the account of the author's travels in various parts of the

territory of the Republic in the collection of the material and data for his work, from 1851 to 1869; it occupies nearly 300 pages, full of interesting points in many branches of physical science, and is itself practically a sketch of Peru and its products. In the incomplete condition of the publication, such of these journeys of the author as covered ground not referred to by other travellers will doubtless remain of value.

Volume II., 'Historia de la Geografía del Peru,' pp. 475, with maps and plates, appeared in 1876. It contains Libro I. of this subject, being a chronological relation of the travels, discoveries, foundation of cities and towns, and notable changes in territorial divisions, which have happened in Peru from the date of the Spanish conquest to the year 1800, and commencing with a notice of the expedition of Vasco Nuñez de Balboa in 1511, recorded by Herrera, which is the first mention of the country. Although professedly historical, this part contains in its account of the various travels much descriptive matter of geographical interest.

The plates represent remains of various Ynca fortresses, &c. (including Sacsahuaman, of which a photograph was presented to the library by Mr. Wallroth), and a view of the celebrated Pongo de Manseriche on the Marañon. The maps are a reproduction of Manuel Sobreviela's delineation in 1791 of the Huallaga and Ucayali, with the included Pampa del Sacramento; and a larger one of the whole republic, illustrating the historical part of the work.

Volume III. consists of Libro II. of the subject of the preceding volume, being a similar treatment from 1799 to the date of publication. It is arranged chronologically (with a good Index), and includes accounts of the numerous voyages in Peru during the present century, with particulars of their geographical results. Separate chapters are devoted to the question of boundaries between Peru, Bolivia, and Brazil; and the volume concludes with a discussion of the claims of the Ucayali and Marañon to be considered the parent stream of the Amazonas, in which preference is given to the Marañon from the far greater body of its water, in spite of the longer course of the Ucayali.

The maps are a copy of an original one of the seat of the Ucayali missions, in the possession of Don Manuel Amez, Governor of Andamarca, in 1833; a chart of the course of the Huillcamayo and part of the Ucayali by Captain Carrasco of the Peruvian navy in 1846, with inset views of the mouths of the Tambo and Pachitea; Wertheman's map of the Perene and Tambo, 1876; and a special map, showing the boundaries of Peru according to ancient and modern authorities, dated 1877.

ARCTIC.

Gilder, W. H.—Ice-Pack and Tundra. An Account of the Search for the *Jeannette*, and a Sledge Journey through Siberia. London (Sampson Low & Co.): 1883, pp. 344 [no index], map, illustrations. Price 18*s*.

Mr. Gilder, who acted as correspondent of the *New York Herald* with the *Rodgers* Search Expedition, here gives in narrative form the history of the cruise of that ship for the relief of the ill-fated *Jeannette*, starting from San Francisco in June 1881, until her own loss by fire in St. Lawrence Bay, Bering Straits, on 30th November of the same year, including the excellent work done round Wrangel Island, the episodes of camp-life on Eetcetlan Island, some 25 miles west of Cape Serdze Kamen on the Siberian coast, and the account of the loss of Mr. Putnam during the wintering. This is followed by a description of the author's own adventurous sledge-journey from Eetcetlan westward to the mouth of the Kolyma on his way to the nearest telegraph station in Eastern Siberia. Here, at Nishne Kolymsk, he first heard of the loss of the *Jeannette*; and he made his way up the Kolyma to Sradne Kolymsk, and so directly west to Werchojansk on the Lena. Arrived there, he had more authentic information as to the object of his search, and at once started down the Lena to its delta, reaching the station at Yoayaska on April 10, 1882. Returning to Werchojansk after meeting with Nindermann and Noros, survivors of De Long's party, and after reading Mr. Melville's despatches with that unfortunate officer's diary, he hurried to Yakutsk, which he reached on May 31, arriving in Europe by the usual route viâ Irkutsk and Tomsk. The story of the *Jeannette* is

completed by quotations from De Long's diary, Melville's report (noticed in the last number of our 'Proceedings,' p. 241), and the account by Nindermann and Noros.

The author's own journey is shown on a general map; there are also maps showing the track of the *Rodgers* north of Wrangel Island in the summer of 1881, with soundings, and a larger map of Wrangel Island itself. Some 50 illustrations (from Eskimo drawings, sketches by the author and others, and photographs) are given, representing various localities of interest, natives, &c.

GENERAL.

Letronne, A.-J.—Œuvres Choisies de A.-J. Letronne, Membre de l'Institut. Assemblées, mises en Ordre, et augmentées d'un Index par E. Fagan. Deuxième Série: Géographie et Cosmographie. Paris (Ernest Leroux): 1883, 2 vols., 8vo., pp. viii. and 534, and 566, maps, plates. (*Williams & Norgate*: price 1*l.* 1s.)

A collection of the essays of the distinguished French critic in archæological geography, who died in 1848, originally undertaken by his daughter, Mdme. Landelle, who died before its publication. This second series, which is entirely independent of its predecessor, is devoted to questions of geography and mathematical history, and consists of the following memoirs and papers:—A letter on a passage of Thucydides relative to the situation of Cape Malée in Lesbos; remarks on passages in Eunapius, Thucydides, Plutarch, &c.; a critical essay on the topography of Syracuse at the beginning of the 5th century B.C. (with map); memoir on a horary table found in the Egyptian temple of Taphis in Nubia; a critical examination of the prolegomena of Ptolemy's Geography; elucidation of passages in Strabo relative to the position of Marseilles and Constantinople; observations on the object of ancient zodiacal representations; a discussion of the question whether the ancients executed a mensuration of the arc of the meridian after the establishment of the Alexandrian School; on the cosmographic associations of the name of Atlas; on the opinion of Hipparchus as to the prolongation of Africa south of the Equator; on the popular and scientific opinion of the Greeks as to an oblique passage of the sun, and of the ancients generally on eclipses; on the cosmographic ideas of the Fathers of the Church as connected with the doctrines of Grecian philosophers; on the situation of the terrestrial Paradise; on the Grecian origin of the so-called Egyptian zodiacal signs, and the origin of the Grecian zodiac and various points of Chaldean uranography and chronology; on the writings and geometrical and astronomical works of Eudoxus of Cnidus; a critical analysis of the zodiacal representations at Dendera and Esné; on the nature, history, and origin of the ancient Egyptian calendar; on the Chaldean divisions of the equator and day after Achilles Tatius, and of the circle into 360 degrees; on some points of the ancient geography of Asia Minor; and various accounts and reviews of modern works by other authors on kindred subjects.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Europe.—Relief-Karte von Central-Europa, nach Dr. Mohl's oro-hydrograph. und eisenbahn-Wandkarte. L. Dickert. Rheinbach, Stumm. Price 10*l.* (*Dulau.*)

Hungary.—Wandkarte der ungarischen Kronländer. H. Berghaus und P. Gönczy. Scale 1:625,000 or 8·5 geographical miles to an inch. Gotha, J. Perthes. 9 sheets. Price 7*s.* 6*d.* (*Dulau.*)

Preussen.—Geologische Karte der Prov.—— Scale 1:100,000 or 1·3 geographical mile to an inch. Sect. 20, 21. Berlin, Schropp. Price 3*s.* each sheet. (*Dulau.*)

Russia.—Eisenbahn- u. Schiffahrts-Karte der Kaiserreiche von Russland und der Turkei, bearbeitet von E. G. Ravenstein. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Frankfurt a/M., Jaeger. Price 3*s.* (*Dulau.*)

——— Die Verteilung der Kosaken im Russischen Reiche. Nach M. Choroschchin. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 71. Justus Perthes, Gotha, 1883. (*Duldu.*)

Sweden.—Sveriges Geologiska Undersökning. Scale 1 : 50,000 or 1·4 inch to a geographical mile. Sheets: 'Vreta Kloster,' 'Kristianstad,' 'Övedskloster,' 'Tjällmö,' 'Dalarö,' 'Finspång.' Topografiska Corpsens. Stockholm. (*Dulau.*)

Wiesbaden.—Topographische Karte der Rheinprovinz u. der Prov. Westphalen. W. Liebenow. Scale 1 : 80,000 or 1 geographical mile to an inch. Sect. 35. Wiesbaden. Berlin, Schropp. Price 1*s.* 6*d.* (*Dulau.*)

AFRICA.

Zambeze and Shire Rivers.—Terrenos adjacentes aos Rios Zambese e Chire, desde as suas ultimas cachoeiras até ao mar Mappa Coordenado, por Affonso de Moraes Sarmento, Engenheiro, ex-chefe da Secção das Obras Publicas de Quelimane e socio ordinario da Sociedade de Geographia de Lisboa, de accordo com os dados e observações por elle colhidas durante as suas viagens de 1877–1880. Scale 1 : 450,000 or 6·2 geographical miles to an inch. 2 sheets.

In vol. iv. of the R.G.S. 'Proceedings' (New Series), page 254, discrepancies existing between the first portion of this map, and the surveys of João Monteiro, Pinto da Fonseca Vaz, were pointed out; but in the two sheets now issued (which in themselves form a complete map of the Lower Zambeze and Shire rivers) the discrepancies are, if possible, more strongly marked; indeed in some portions, the course of the Zambeze bears but a very slight resemblance to that assigned to it by Sr. Fonseca Vaz. At Senna, the Island of Inhamgoma is entirely different in form, position, and dimensions; and while the present map shows the Shire as flowing into the Zambeze from a direction a little west of north, the map of Sr. Fonseca Vaz lays it down as coming from the north-east; indeed there is so little agreement in the results of these two surveys, even in the general course of the Zambeze, that it is difficult to understand how two competent surveyors should have produced such discordant results.

Crevaux, Docteur Jules.—Fleuves de l'Amérique du Sud 1877–1879. Par le Docteur Jules Crevaux, Médecin de la Marine Française. Missions du Ministère de l'Instruction Publique. Publié par la Société de Géographie. Paris, 1883.

This atlas contains 40 sheets of the surveys of South American rivers made by the late Dr. Jules Crevaux, during the years 1877, 78, and 79. The arrangement of the maps, and the scales on which they are drawn, are as follows:—Index, 1 sheet, 1 : 3,500,000. Yary, 2 sheets, 1 : 400,000. Oyapock, 2 sheets, 1 : 225,000. Rouapir et Kou, 1 sheet, 1 : 125,000. Parou, 8 sheets, 1 : 125,000. Içа ou Putumayo, 12 sheets, 1 : 200,000. Yapura, 14 sheets, 1 : 225,000. The information contained in this atlas is valuable; there are many corrections of assigned positions, and much that is entirely new. The scales on which the surveys have been published are well chosen, and the maps themselves are clearly executed.

As an introduction, M. Georges Revoil gives a short biographical sketch of the late Dr. Crevaux, the perusal of which in connection with the maps, cannot fail to impress all who are interested in the progress of geographical science, with the great loss we have sustained in the untimely death of this able and energetic explorer.

Greenland.—Die Westküste Grönlands zwischen Godhavn u. Pröven. Nach den Aufnahmen von R. Hammer & K. J. V. Steenstrup 1878–1882. Scale 1 : 1,600,000 or 21·7 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1883, Taf. 5. Justus Perthes, Gotha. (*Dulau.*)

AUSTRALIA.

New South Wales Government Maps:—

Bathurst, City of——, County of Bathurst, Land District of Bathurst, N.S.W., 1882. Scale 8 chains to 1 inch. Surveyor-General's Office, Sydney.

Braidwood, Plan of the Town of——, Parish of Braidwood, County of St. Vincent, Land District of Braidwood, N.S.W., 1882. Scale 8 chains to 1 inch. Surveyor-General's Office, Sydney.

Collendina, Parish of——, County of Hume, Corowa Land District, N.S.W. Scale 40 chains to 1 inch. Surveyor-General's Office, Sydney, 1882.

Hovell, Parish of——, County of Hume, Land District of Albury, N.S.W. Scale 40 chains to 1 inch. Surveyor-General's Office, Sydney, 1882.

Kentucky, Parish of——, County of Hume, Land District of Corowa. Scale 40 chains to 1 inch. Surveyor-General's Office, Sydney, 1882.

Moorwatha, Parish of——, County of Hume, Land District of Albury, N.S.W. Scale 40 chains to 1 inch. Surveyor-General's Office, Sydney, 1882.

Morebringer, Parish of——, County of Hume, Land District of Corowa, N.S.W. Scale 40 chains to 1 inch. Surveyor-General's Office, Sydney, 1882.

New South Wales.—Map showing the Postal Stations and Roads in New South Wales. Prepared for the use of the Post Office Department. August 1882. Scale 1:1,370,000 or 18·7 geographical miles to an inch. 2 sheets. Lithographed and printed at the Surveyor-General's Office, Sydney.

Quat Quatta, Parish of——, County of Hume, Corowa Land District, N.S.W. Scale 40 chains to 1 inch. Surveyor-General's Office, Sydney, 1882.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in January and February 1883.

No.			Inches.	
950	m m	= =	0·8 1·9	Borneo, north-east coast:—Sandakan harbour. Price 1*s.* 6*d.*
1055	m	=	0·1	Australia, west coast:—Redout Island to cape Cuvier. (Plans, Ports Hedland; Walcott; Robinson.) Price 2*s.* 6*d.*
289	m	=	1·0	Newfoundland, west coast:—Bay of Islands, with Little Port, York and Lark harbours. Price 2*s.*
1465	m	=	various.	Spain, east coast:—Cullera anchorage, Port Denia. Benicasim road. Columbretes islands. Price 1*s.*
591	m	=	1·44	North America, west coast:—San Francisco harbour. Price 2*s.* 6*d.*
724	m	=	various.	Indian ocean:—Islands and reefs between Seychelle islands and Madagascar (Dependencies of Mauritius)—Providence and St. Pierre islands, with Wizard reef. D'Arros and St. Joseph islands. Ile des Roches. Glorioso islands. Bird island. African islands. Price 1*s.* 6*d.*
285	m	=	0·3	Newfoundland, east coast:—Orange bay to Gander bay, including Notre Dame and White bays. (Plans, Cutwell harbour. Great Troytown harbour. Fortune harbour.) Price 2*s.* 6*d.*
1471	m	=	20·7	Ireland, east coast:—Kingstown harbour. Price 1*s.* 6*d.*

936*a* Plan added, Aue anchorage.

712 Plan added, Neddy harbour.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
950	Sandakan harbour	New plan, Sandakan harbour ..	950
1055	Cape Lambert to cape Farquhar ..	New chart, Redout island to cape Cuvier	1055
289	Bonne bay and bay of islands ..	New plan, Bay of islands	289
637	Little port and York harbour ..		
1465	Anchorages on east coast of Spain	New plans, Anchorages on the east coast of Spain	1465
1239	Columbretes rocks		
591	San Francisco harbour	New plan, San Francisco harbour	591
724	Eagle, Bird, and Ile des Roches or Wood island	New plans, Islands and reefs between Seychelle islands and Madagascar	724
285	Cutwell harbour	New chart, Orange bay to Gander bay	285
286	Triton harbour		
287	Fortune harbour		
1471	Kingston harbour	New plan, Kingstown harbour ..	1471
2428	Kustenjeh to Chernavoda and Rassova.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2793. England, south coast:—Cowes harbour. 1825*a*, *b*. England, west coast:—Irish channel, 2 sheets. 1854. Azores islands:—San Miguel. 1439. Scotland, east coast:—Frazerburgh. 393. West Indies:—Providence channels to Windward and Mona passage. 486. West Indies:—Jamaica and Pedro bank. 2407. Russian Tartary:—Eastern Bosphorus and Novik bay. 933. Java:—Batavia road. 71*a*. India:—Coromandel coast. 2403. Malacca strait:—Singapore strait. 2397*a*. Scotland:—North and east coasts. 2806. United States:—Charleston harbour. 769. Pacific ocean:—Admiralty and Hermit islands. 1258. China:—Approaches to Séoul. 2881. West Indies:—Cay West harbour. 1624. England, east coast:—Scarborough. 1713. Africa, west coast:—Cape Three points; Axim, &c. 2347. Japan:—Nipon, Kiu Liu, and Sikok island. 942*a*. Eastern archipelago:—Eastern portion. 2376. China:—Tamsui harbour, Sau-o-bay, &c. 814. India, Hoogly river:—The Sandheads. 1863. Africa, west coast:—Forcados river to cape Formoso. 2137. Eastern archipelago:—Gaspar strait. 525. Gulf of Mexico:—Boca Grande cay to Tortugas cays. 1877. Africa, west coast:—Gaboon river. 1982*b*, *c*. South America, east coast:—Parana river, 2 sheets. 1790. Scotland, west coast:—Oban bay. 2373. Baltic sea:—Riga gulf. (*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—Paris.—Charts No. 3897. Côte Nord de France. De Calais à Gravelines. Atterrages de Gravelines. 1882.—3911. Côte Nord de France. D'Argenton a la Pte. de Corsen et Partie du Chenal du Four. 1882.—3910. Côte Nord de France. Rade de Calais. 1882.—3891. Côte Nord de France. Du Cap Gris-Nez à Calais. Atterrages de Calais. 1882.—3879. Côte Nord de France. De l'Ile du Bec à Argenton. Roches de Porsal. 1882.—3905. Côte Ouest de France. Abords de l'Ile de Molène. 1882.—3901. Mer de Chine. Côte Est de Cochinchine. De l'Ile Buffle à Poulo Canton. 1882.—3899. Mer de Chine. Golfe du Tonquin. De Hué aux Iles Culao Cham. Environs de Tourane. 1882.—3871. Côte Ouest de l'Indoustan. Croquis de l'Entrée de la Rivière de Mahé. 1881.—3908. Océan Indien. Golfe d'Aden. Berbera. 1882.—3876. Terre Neuve. Côte Nord-Ouest. De la Baie

d'Ingornachoix à l'Anse aux Sauvages dans le Détroit de Belle Ile. 1882.—3906. Guyane Française. Rivière de Sinnamari. 1882.—3825. Tahiti. Côte Est. De Pueu à Vaitoto. 1881.—3863. Nouvelle Calédonie. Passages d'Isie. 1881. —3859. Mer de Corail. Iles Chesterfield. Mouillage de l'Ile Longue. 1881.— 3874. Océan Pacifique Sud. Iles Marquises. Ile Fatu Hiva. Baie d'Omoa ou du Bon Repos. Ile Ua-pu. Baie d'Hakahetau. 1881.—3912. Océan Pacifique, Archipel Tuamotu. Ile Mururoa. 1882. Dépôt des Cartes et Plans de la Marine, Paris.

United States Chart.—West Coast of Mexico. Eastern Shore of the Gulf of California. Harbour of Altata. Surveyed by the Officers of U.S.S. *Ranger*, Commander J. W. Philip commanding. 1882. Scale 3 cables to an inch. Published November 1882 at the Hydrographic Office, Washington, D.C. Price 1*s.* 5*d.*

ATLASES.

Atlas Manuel de Géographie Moderne, contenant 54 cartes imprimées en couleur. Parts: 2, 3, and 4. Hachette, Paris. Price of each part 2*s.* 6*d.* (*Dulau.*)

Oesterreich-Ungarn, Physikalisch-Statistischer Hand-Atlas von——, in 24 Karten mit erläuterndem Text, unter Mitwirkung von Vincenz v. Haardt, Prof. Dr. Anton Kerner Ritter v. Marilaun, Franz Ritter v. Le Monnier, General-Major Carl Sonklar v. Innstätten, Prof. Dr. Franz Toula, herausgegeben von Dr. Josef Chavanne und ausgeführt in Eduard Hölzel's Geographischem Institute. III. Lieferung. Inhalt: Nr. 1. Wärmevertheilung im Jahresmittel (mittlere Jahres-Temperatur). Nr. 8. Karte der Stromgebiete. Nr. 9. Höhenschichtenkarte. Wien, Eduard Hölzel, 1883. Price 7*s.* (*Dulau.*)

Schweiz, Topographischer Atlas der ——. Scale 1:25,000 or 2·9 inches to a geographical mile. Lief. 22 mit 12 chromolith. Karten. Swiss Federal Government. Bern. Price 13*s.* (*Dulau.*)

EDUCATIONAL.

Schleswig-Holstein.—Neue Schulwandkarte. Dr. R. Kiepert. Nach den Aufnahmen der Koniglichen preussischen Generalstabes bearbeitet und gezeichnet. Scale 1:200,000 or 2·7 geographical miles to an inch. Schleswig, Bergas. 6 sheets. Price 6*s.* 6*d.* (*Dulau.*)

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10,000 feet. The main chain is nowhere disturbed by volcanic eruptions,

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Basins of the Amaru-mayu and the Beni.

By Clements R. Markham, C.B., Secretary R.G.S.

(Read at the Evening Meeting, April 9th, 1883.)

Map (*Inset Map*), p. 376.

The receipt of Dr. Heath's diary and valuable maps has brought to our knowledge the achievement of an important feat in South American geography, namely, the discovery of the whole course of the great river Beni. The work of this intrepid explorer will now be brought fully to the notice of the meeting, but its relative significance can only be properly appreciated by considering the physical aspects and the history of discovery over the whole Beni system. From every point of view it is a subject of great interest to the geographer; and moreover it includes the story of other noble exploring adventures hitherto unrecorded by this Society, which deserve a place side by side with the admirable work of Dr. Heath.

The fountains of the Beni system of rivers which supply a large third of the volume of the Madeira, one of the chief tributaries of the Amazons, flow from the great snowy chain of the Eastern Andes for a length of upwards of 500 miles. They converge into two main streams called the Amaru-mayu or Mayu-tata, and the Beni, which, uniting with each other, and then with the Mamoré, combine, with the Itenez, to form the great Madeira river.

The snowy range of the Eastern Andes is an unbroken mass, with a high plateau to the westward and the vast plains of the Amazonian basin to the east. It sends up peaks, such as Illimani and Illampu, to a height exceeding 21,000 feet, and it is remarkable that these towering masses are not bosses of granite, but are of Silurian formation and fossiliferous to their summits. The whole range is highly auriferous, containing frequent veins of gold bearing quartz usually associated with iron pyrites; and the thickness of the strata is not less than 10,000 feet. The main chain is nowhere disturbed by volcanic eruptions,

except at the very edge of the formation near Lake Titicaca; and in these respects it differs essentially from the maritime cordillera of the Andes. The characteristics of the Eastern Andes have an influence over the plains which are traversed by rivers flowing from them. The limit of perpetual snow is at 15,800 feet, below which there are steep grassy slopes and precipitous declivities, and thence numerous spurs extend for varying distances into the plain, inclosing profound ravines. It is here that the majestic beauty of the scenery of the Andes is fully realised. Masses of dark mountains rise for thousands of feet, with their bases washed by foaming torrents and their summits terminating in sharp peaks or serrated ridges. The lower slopes are covered with dense vegetation, the green tints often varied by masses of gorgeous flowers; and, above the forest, the grassy slopes are brightened by the yellow of calceolarias and the rich purple of a melastoma. As the ravines are descended the forest becomes more dense, the open glades disappear, and the delicate pink and white of the chinchona blossoms, set in glossy verdure, begin to dot the hill-sides. Everywhere there is flowing water, the condensed moisture of the trade winds hurrying back to the Atlantic. Here is seen a white sheet of continuous foam rushing down the polished side of a precipice and seeming to plunge into a bed of ferns and flowers, there a blue sheet of water appearing to issue from the fleecy clouds that shroud the mountain peaks; everywhere the roar of falling water. As the ravines subside, more extended views are obtained, and at length the vast illimitable plain is seen stretching away in one unbroken forest, the green tints changing to faint blue on the far off horizon. This has ever been a land of mystery, a land to interest and excite the imagination of generations of explorers.

As would naturally be expected, the streams flowing from the auriferous Andes are full of gold. In the ravine of Tipuani the blue clay slates, associated with gold, extend to the river Beni. The gold of Caravaya has been famous for centuries, and in Marcapata is the golden hill of Camanti. But the products of the ravines and of the vast plain beyond are not confined to the precious metal. Gold is far from being the most valuable branch of their varied sources of wealth. This is the region of the chinchona bark richest in quinine, of the finest coffee and cacao in the world, of many kinds of rare and valuable cabinet woods, and of inexhaustible supplies of indiarubber.

The two great rivers to which all the thousand streams, pouring down the eastern slopes of the Andes, converge, are the Beni and the Amaru-mayu, which unite after courses of 500 miles each. One may be said to come from the vicinity of La Paz, the other from the confines of Cuzco, one the outlet for the commercial capital of Bolivia, the other for the ancient capital of Peru. The Beni receives all the streams from near Cochabamba to the frontier of Peru, including those of the famous Yungas of La Paz, and of Ayopaya, Caupolican, Larecaja, Apolobamba,

and Munecas. On the Peruvian frontier is the ravine of Tambopata, so rich in chinchona bark, whose river becomes the Madidi, the largest of the Beni tributaries.

The Amaru-mayu has, however, been ascertained by Dr. Heath to be the principal river as regards volume; and this is explained by the physical conformation of the region. The rivers which form the Beni flow direct from the Andes, down ravines, to their parent stream. But in the case of the Amaru-mayu system there is, throughout the provinces of Caravaya and Paucartambo, and beyond the spurs of the Andes, an isolated line of hills running parallel with the main chain. These hills are described as precipitous and gold-bearing, so that they are probably of the same formation as the Andes; but the hills have only once been visited by a scientific traveller, Dr. Don Antonio Raimondi (our Honorary Corresponding Member), in 1864, and his narrative is not yet published. The whole of the rivers of Caravaya are diverted by this isolated range, and form one great stream called the Ynambari, receiving tributaries from both sides, and flowing for a great distance parallel to the Andes, until it forms a junction with the Amaru-mayu coming from the valleys of the Cuzco *montaña*. In consequence of this lateral diversion of the Caravayan rivers, along a distance of nearly 200 miles, a very great volume of water is conveyed to the Amaru-mayu, which swells its dimensions into a noble stream, and gives it a right to claim the Beni as a tributary.

Thus we have to contemplate a portion of the snowy range of the Eastern Andes, the courses of the two great rivers which drain it, with their numerous important tributaries, and the vast unexplored plain stretching away from the bases of the mountains.

There has been a halo of romance resting over this great eastward-stretching plain, like the blue haze on the distant horizon, where the apparently illimitable forests seem to mingle with the sky. The great civilised empire of the Yncas was established on the lofty plateaux to which the Eastern Andes form a bulwark rising out of the forests, and the Yncas were attracted to those rich and unknown regions by the desire to improve the condition of their people as well as by enlightened curiosity. The Yncas formed colonies in all the ravines to the eastward, in accordance with their policy of exchanging products. Each colony came from a particular district on the lofty plateau, and kept up regular communication with the mother village, receiving quinua, preserved potatoes, dried meat, and clothing, and sending in return cabinet woods, medicinal drugs, fruits, coca, and gold.

It was a more formidable undertaking to penetrate far into the forests to the eastward. Here there were perils without end, dangers from wild animals, from savage people, from swollen rivers, and from starvation. But the almost perfect system of land transport and commissariat which formed part of the Ynca system of government, enabled

that highly civilised people to overcome them all. In the fifteenth century the Ynca Yupanqui determined to send an expedition to explore the whole region of the Amaru-mayu, or "serpent-river," and learn the secrets of the unknown land beyond the horizon. During two years he caused timber to be cut and dressed, and canoes to be made, while dried provisions were collected. The stores were carried in the centre of each canoe on high platforms, so that they might not get wet. After the expedition started the first work was to overcome the fierce tribes of Chuncho savages who inhabit the forests within 20 miles of the base of the Andes. They were so completely subdued, not so much by force of arms as by wise conciliatory measures, that they gave in their allegiance, adopted agricultural habits, lived in large barrack-like houses 100 feet long, 40 wide, walls six feet high, and good pointed thatched roofs, in accordance with the Ynca system (and continue to do so to this day), and regularly paid tribute in kind until, by the execution of Tupac Amaru, the Ynca rule was unwisely destroyed by the Spanish Viceroy Toledo in 1571.

The Ynca expedition then continued the descent of the great Amaru-mayu river, and completed the discovery. There were serious losses by the way, but about a thousand men reached the country of the Moxos and formed a colony, sending news of their success to Cuzco. The main facts of this expedition are certainly historical. The civilising influence of the Yncas thus spread over the vast plain, and Colonel Church mentions the existence of an ancient Ynca road on the banks of the river Beni.

After the Spanish conquests it was believed that many thousands of the Yncas fled into the forests. Expeditions went in search of them, and there was a tradition of the existence of a fabled Empire of Paytiti beyond the eastern horizon. There was a certain basis of truth in those stories. But the stern facts during Spanish times were that the savage Chuncho Indians encroached more and more on the few coca and cacao farms near the base of the Andes, that the missionaries alone succeeded in penetrating to any distance, and that the bark-collectors and gold-seekers scarcely ever went beyond the outer spurs of the mountains. It was not the policy of the colonial government of Spain to seek new routes for commerce.

As soon as the independence of Peru and Bolivia was established, the people began to desire very earnestly that a highway should be opened for them to the Atlantic. They saw that their prosperity and advancement mainly depended on that great measure, and that there could be no real progress for them until it was secured. Their own efforts have not been wanting. Especially have the people of Cuzco worked zealously to explore their forests, and examine the course of the Amaru-mayu river.

In 1835 our gallant countryman, General Miller, conceived the idea

of planting a military colony on the banks of some navigable river on the eastern slopes of the Andes, to facilitate the discovery of the vast plains towards the Madeira, and to endeavour to open a direct communication with Europe by the Amazons. He was Prefect of Cuzco at the time, and he made a journey into the forests of Paucartambo, an account of which was published in our 'Transactions'* but he was unable to give permanent effect to his well-conceived plans. He treated the Chunchos kindly, and they continued to be friendly during his sojourn in their neighbourhood, although they were opposed to his further advance.

But after 1840, they began to make persistent attacks on the few estates near the base of the Andes, destroying several, and spreading consternation over the whole district. The Peruvian Government then commissioned Colonel Espinar, of Cuzco, to visit the remaining farms and report on the state of affairs. He left the town of Paucartambo in 1846, crossed the Eastern Andes by the pass of Tres Cruces, and visited the farms of San Miguel and Cosñipata. The results of his researches are embodied in a Report, published at Cuzco in 1846,† in which Colonel Espinar gives a charming description of the scenery of the forests, supplies information respecting the hydrography, and furnishes some account of the three savage tribes of Chunchos, called Huachipayvis, Treyuneris, and Sirineyris.

The next pioneer of discovery in the direction of the Amaru-mayu was the Italian friar, Father Bovo de Revello. He was a man of large proportions, tall and broad-shouldered, with massive forehead, bald head, and long beard. Brave as a lion, foremost to lead in all dangers, he was at the same time gentle and tender-hearted. He had passed several years in the Holy Land, and some time in the missions of Southern Chile. He was well versed in the history of discovery in all parts of the world, was a naturalist, and a good geographer. In 1847 his fervent imagination was fired with the idea of opening a direct route to Europe for the ancient city of Cuzco, the capital of the Yncas. With boundless enthusiasm, ballasted by great learning and scientific knowledge, he plunged into the forests of Paucartambo. He was a true apostle of progress. While he worked for religion, he was also a friend of geographical science. Solitude had for him no terrors, for he found unceasing pleasure in the contemplation of nature, and of man in his wild state. Returning to the old Ynca capital, after a year of close study of his problem in the forests and on the swollen river banks, he published his 'Brilliante Porvenir del Cuzco' in 1848, a work remarkable as well for its research and learning, as for its enlightened and practical views. He dedicated it to the good General Medina, then

* R. G. S. Journ., vi. p. 174.

† 'Primera Memoria sobres los valles de Paucartambo y adyacentes, por J. D. Espinar.' Cuzco, 1846.

Prefect of Cuzco, and concluded with an ardent appeal to the inhabitants of the Ynca capital. "People of Cuzco," he exclaimed, "to you belongs the initiative for navigating the rivers to the east of your Andes. It is for you, and for your best interests, to turn your backs on the Pacific, and to open up the vast and fertile Amazonian plains."

He then returned to the forests, and when Lieutenant Gibbon, of the U.S. Navy, entered them in 1851, he was accompanied by the enthusiastic Italian missionary to his furthest point, at the junction of the rivers Tono and Piñi-piñi, where the Amaru-mayu may be said to commence.

The appeal of Bovo de Revello to the manhood of the people of Cuzco was not made in vain. He inspired many of them with his own enthusiasm. They formed a "Sociedad Industrial de los Valles de Paucartambo," of which my friend General De la Guarda, then Prefect of Cuzco, became president. Under the lead of a talented young artist, named Manuel Ugalde, thirty-six youths of Cuzco, of the best families, entered the forests, with the intention of attempting the descent of the Amaru-mayu. In 1852 they reached the banks of the Tono, and were joined by Father Bovo de Revello. Ugalde had conceived the idea of utilising the indiarubber of the surrounding forests in the construction of a raft. Search was made for the trees, several depôts were formed, paths were cut through the forests, and eventually a number of indiarubber or waterproof cylinders were prepared, which were secured to the poles forming the raft. Father Bovo de Revello instilled his own enthusiasm into the youth of Cuzco, while Ugalde directed their efforts. Two rafts were thus constructed, and launched at the junction of the Piñi-piñi and Tono. But all these high hopes ended in disappointment. It would seem that they ought to have committed their fortunes to the river below and not above the rapid. In the midst of the impetuous current the rafts encountered the rush of a flooded affluent. They were driven on rocks and capsized. Ugalde had taken the precaution to provide life-belts made from the indiarubber he had prepared. His people were all saved; but the expedition, begun with so much promise, and carried through with such forethought and perseverance, was wrecked.

In May 1853, a year after this catastrophe, I penetrated into the forests of Paucartambo.* I found that the Chunchos had since made successful attacks on the few coca and cacao estates, and that only two remained, called San Miguel and Cosñipata. Here I met with Father Bovo de Revello, almost alone. His only food was parched maize, *chuñus*, and bananas. I went with him to the point where Ugalde commenced his navigation. But he was then destitute of all resources, and enthusiasm alone could not take us further. He was a man of commanding presence. I remember looking upon him as a forlorn hope, holding an outpost against desperate odds. He seemed to feel that while

* See R. G. S. Journ., xxv. p. 151.

he held his ground, like a beacon on a watch-tower, the youths of Cuzco would continue to organise fresh attempts. He was the rallying point. Such a man would not abandon his post while life endured. He died there—a noble martyr to the cause of geographical discovery.

Father Bovo de Revello did not work in vain. He instilled a love of adventure and an ardent desire to achieve success into the people of Cuzco which survived him.

In 1860 Don Faustino Maldonado and seven companions organised a fresh expedition. With scanty means, but full of enthusiasm, they were resolved to encounter and overcome whatsoever dangers and privations might stand in the way rather than fail in their enterprise. The names of these gallant explorers deserve to be held in memory. They were:—Faustino Maldonado, Estevan Trigoso, Andres Guerra, Raimondo Estella, Gregorio Maldonado, Manuel Chapalba, Manuel Santa Rosa, Simon Rodriguez. They left Cuzco on the 26th of December, 1860, descended into the forests, and advanced along the banks of the river Tono, until they reached the junction with the Piñi-piñi. Here they constructed a raft during January 1861, but by the time they had finished it their scanty stock of provisions was exhausted, as well as their ammunition. Most men would have returned. But they resolved to push onwards, trusting to supplies of bananas and yucas from the Indians, or to wild fruit. If these failed they could but die for their country. At all events they would not turn back. This is the stuff that the young men of Cuzco are made of. There are few nobler deeds of heroism recorded in the annals of geographical discovery than the persistency of Maldonado and his comrades in risking all in order that work so important to their fatherland might be done. In February they embarked, and succeeded in navigating their frail raft over the rapids. Next day they were attacked by savages in canoes, who hunted them for many hours. As the days went on they became weak from hunger. Their only food was the bananas occasionally found in clearings along the river banks. Near the mouth of the great river Ynambari they were attacked again, and Andres Guerra was wounded with an arrow. But this was the last hostile act, and soon afterwards they came to a friendly tribe who sold them a canoe. At length they reached the confluence of the Amaru-mayu and Beni, and soon afterwards they approached the rapids near the mouth of the Beni. They had explored the whole course of the Amaru-mayu for the first time since it was descended by the troops of the Ynca Yupanqui in the fifteenth century. It would appear to be a noble stream, and clear of all obstructions from the point of embarkation to the rapids of the Beni. Maldonado and his companions abandoned their raft above the rapids, walked round them, and constructed another below. But they were now very weak and faint from want of food. They proceeded, six of them on the new raft, and two in a small canoe, and on entering the Madeira they met with some friendly Caripuna

Indians, obtaining a little food. Continuing their voyage for several days, the raft got into a dangerous rapid on the 18th of March, was dashed against rocks and broken up. Four out of the six explorers were unfortunately drowned, namely, Maldonado himself, Gregorio Maldonado, Trigoso, and Guerra. Two reached the shore, and the two in the canoe were safe. But the four survivors were nearly naked, weak from fasting, and without food. At length they reached the station of a friendly Brazilian who supplied all their wants. They were sent down to the Brazilian town of Barra, on the Amazons, and returned home by way of Tarapoto in the following May. They had solved one of the two great geographical problems connected with the region to the east of Cuzco. These brave youths of the old Ynca city had explored the whole course of the Amaru-mayu.

In 1865 our Corresponding Member, the accomplished and indefatigable Don Antonio Raimondi, turned his attention to the Paucartambo forests. Like General Miller and Colonel Espinar, Raimondi describes with enthusiasm the magnificent scene which burst on his view from the pass of Tres Cruces. He went to the estate of Cosñipata, but found the labourers in a constant state of alarm at the approach of the savage Chunchos, while all the other estates had been abandoned and destroyed. He returned after making numerous valuable observations.

The next expedition into the Paucartambo forests was undertaken by Juan G. Nystrom in 1868. He reached the confluence of the Piñi-piñi and Tono, reported that the united stream became navigable at the junction of the Marcapata, and fixed several positions by astronomical observations.

The spirit breathed into the people of Cuzco by the enthusiasm of Bovo de Revello, still continued to animate them. In 1873 an expedition was organised consisting of fifty soldiers and pioneers, and commanded by the Prefect of Cuzco himself, Colonel Don Baltazar La Torre. Señor Germain Göhring accompanied the party, to conduct the scientific work. Proceeding by way of Paucartambo and Tres Cruces, the explorers reached Cosñipata on May 25th, and pushed on through the forests, to the junction of the Piñi-piñi and Tono. A few miles further on the united stream forces its way through a chain of hills at a place called Ccoñec, and forms a dangerous rapid. Here Colonel La Torre began the construction of a raft, but there were deluges of rain, and the river rose so that the workmen found themselves on an islet surrounded by the angry flood, and overshadowed by the dense forest. Owing to failure of provisions a number of men were sent back to Cosñipata, and the party was reduced to twenty. At length the raft was finished, and on July 6th it was resolved to move the camp lower down the river. Göhring and four men were to go by land, while the Prefect, his secretary, Don Baldomero Cano, Captain José Maria Chavez, Ensign

Vicente Caloma, and some soldiers embarked on the raft for a trial trip. No sooner was the raft allowed to get into the stream, than it was whirled impetuously along by the current and brought up against an island. All hands, except Colonel La Torre, jumped out to hold it with a rope. But the rope broke, and they beheld their commander, alone on the raft, carried with breathless velocity to the rapids, and disappear amidst the foam and rocks.

They succeeded in wading to the shore, and set out at once in search of the Prefect, but with little hope of ever seeing him alive. Five days afterwards, on July 11th, while they were holding a parley with some Sirineyri Chunchos, a man emerged from the forest, who proved to be their lost commander. He had succeeded in steering the raft safely through the rapids, but she was afterwards wrecked among some rocks. He reached the shore, but had since suffered terrible privations in the forest, and was exhausted with long fasting. The party advanced for another day, and came to a beach with an island in front, where there were about fifty Chunchos. During the night whistling was heard all round them in the woods. Next day, being desirous of establishing friendly relations, Colonel La Torre crossed in a small canoe, to a shingly beach on the island, bordered by forest, with Dr. Cano, young Caloma, and a soldier. The others watched from the river bank. They saw the little party land and make signs, the savages who were standing on the beach suddenly disappeared among the trees, reappeared with bows and arrows, and surrounded the officers. There were shouts, and reports of revolvers, the savages again disappeared in the forest, and all was silent. It was all over in a few minutes. Captain Chavez plunged into the water and swam to the island, followed by four soldiers. They found the body of Colonel La Torre pierced by thirty-four arrows, and with two blows on the head, each sufficient to cause death. Dr. Cano was also dead. Young Caloma had disappeared. Sorrowfully the survivors returned to Cuzco. Göhring had, however, made numerous valuable observations. From a hill he had been able to make out the confluence of the Marcapata with the Amaru-mayu. He constructed a map of the region traversed, and collected 300 mineralogical specimens.

Since the death of La Torre in 1873, we have no further news of the progress of exploration. The calamities which have overtaken Peru, have checked it for a time. The flower of the youth of that country has had to fight desperately for their fatherland. The bones of many young heroes, who might have continued the work of Ugalde and Maldonado, now whiten the deserts of Tarapaca, and form heart-rending piles on the sandhills of Tacna.

There, however, in the ancient capital of the Yncas, is the spirit of enlightened progress still smouldering. The men of Cuzco have worked manfully for geography. They have earned a claim to help from the outer world. Will they not receive it?

We have now passed in review all that has been done to explore the main course of the Amaru-mayu river.

With regard to its principal tributary, the Ynambari, which, deflected by the off-lying range of hills, flows parallel with the Andes, and receives all the streams of Marcapata and Caravaya, our knowledge is still very scanty. The main stream of the Ynambari has never been explored to its junction with the Amaru-mayu; but its head-waters and most of its tributaries are more or less known. The Marcapata ravines, which come next to the Paucartambo valleys (travelling south and east), have been famous, for the last hundred years, for their auriferous deposits. The golden hill of Camanti was first made known in 1788, and in this century companies have been formed to work it. In 1851 Colonel Bolognesi undertook to collect bark in Marcapata, and while in his employment a young Englishman named Backhouse (son of Mr. Backhouse, of the Foreign Office, who was on our Council from 1836 to 1841) lost his life in an encounter with the Chunchos. Next to Marcapata are the beautiful ravines of Caravaya, also famous for their gold-washings, their coca estates, their coffee and fruit, as well as for their chinchona bark. They have been frequented by traders since the time of the Yncas, and have been the scenes of intelligent enterprises, undertaken by energetic Peruvian capitalists, chief among whom is Don Agustin Aragon. But they have seldom been visited by geographers. In 1864 our Honorary Corresponding Member, Don Antonio Raimondi, communicated to this Society the results of his exploration of the rivers San Gavan and Ayapata;* and my paper on the province of Caravaya, written after I had visited the ravines of Sandia and of the Huari-huari, was published in our Journal.† Señor Raimondi also made a journey to the gold-mines of Challuma, when he crossed the Huari-huari (Ynambari) river.

With the Huari-huari river, in Caravaya, the Amaru-mayu system comes to an end. It is separated from the basin of the river Beni by a ridge called Marun-kunka; and the first or most western of the Beni tributaries is the Tambopata.

The lovely ravine of Tambopata, with its sides clothed with many varieties of chinchonaceous trees, foremost among which is the calisaya, was first visited by Dr. Weddell, the eminent quinologist, in 1846, and in 1860 I penetrated for some distance through its dense forests, to a point some miles beyond the Yanamayu tributary. But my duties were not consistent with extended exploration, and Señor Raimondi, in 1864, advanced much further, to a place called Putina-puncu, where the two rivers Tambopata and Pablo-bamba unite, both flowing from the Andes on either side of a lofty forest-covered ridge. Señor Raimondi collected information which convinced him that the Tambopata formed the head-waters of the Madidi, the chief tributary of the Beni. The whole course

* Journal, vol. xxxvii. p. 116 (with map). † Vol. xxxi. p. 190.

of this important river has not yet been explored. All the Andean range, from the Tambopata to Cochabamba, sends feeders to swell the volume of the Beni. Next in importance to the Madidi is the river Maperi, flowing from the bases of the loftiest peaks, Illimani and Illampu, and receiving streams which water the ravine of Tipuani, famous for its gold-washings, and of Coroico, rich in the best species of chinchona trees.

The main stream of the Beni comes from the fertile Yungas of La Paz, and is the future outlet for the trade of the commercial capital of Bolivia.

Until the voyage of Dr. Heath, the course of the Beni had never been completely explored. Searchers for chinchona bark, and searchers for gold, had penetrated far down the ravines leading to it, and in recent years the collectors of indiarubber had gone to still greater distances; but the most extensive exploration had been achieved by the missionaries. Much of this good work was done by the College of Moquegua, in Peru, established in viceregal times. One of its disciples, Father José Figueira, was in charge of the mission of Cavinas, near the junction of the Beni and Madidi, and in July 1802 he made a voyage on the former river, in the course of which he received distinct information that the Beni united with the Amaru-mayu from Cuzco. A Jesuit mission was established among the Cavinas, near the mouth of the Madidi, in 1827. A missionary named Samuel Mancini was in the basin of the Beni from 1850 to 1864. He actually traversed the region between the Beni and Amaru-mayu, here called the Mayu-tata, reached Sandia in Caravaya, and eventually constructed a map. Colonel Church tells us that two Franciscans whom he knew at La Paz, one named Fidel Codinach, had reached the Amaru-mayu in 1866 by a five days' journey north-west from the mission of Cavinas.

Still the river had never been descended, and the lower and unknown course was so dreaded, that indiarubber collectors actually conveyed all their produce by a roundabout route up the river to avoid it. As regards the mouth of the Beni, in the river Mamoré, an expedition had been sent to ascend its course by the Bolivian Government in 1846, under the command of Don Agustin Palacios. He went up the river for 18 miles, where he found its course obstructed by rocks. Professor Orton, the well-known American explorer, projected the ascent of the Beni in 1877, in company with Mr. Ivon Heath, but his plans were frustrated by a mutiny of his people when within 24 miles of its mouth.

Such was the state of knowledge of this interesting river when Dr. Edwin Heath, brother of Ivon Heath, the companion of Professor Orton, undertook his bold enterprise. Colonel Church truly says that "Dr. Heath is entitled to much praise for his quiet, unobtrusive solution of a problem which has greatly interested the geographical and commercial worlds." Dr. Heath is understood to have been once employed professionally in Peru, in the construction of the Àroya railroad, and

was afterwards similarly employed by the contractors of the Madeira and Mamoré railway. Thence he entered Bolivia by ascending the Mamoré to Exaltacion, and proceeded, by the customary route of the river Yacuma, to Reyes, near the river Beni.

On August 3rd, 1880, Dr. Heath left Reyes to descend the Beni, and visit the indiarubber camps at Cavinas. He embarked in a boat manned by eight Indians with paddles. At every bend there is a sand-bar where animals come from the forest to drink, and in the afternoons jaguars were often seen. While stopping for breakfast, some of the boatmen took the opportunity of making themselves new shirts. A young brazil-nut tree of the proper size was stripped of its bark to a height of eight or 10 feet. This was taken to the river, placed on a log or stone, and beaten with a stick. When free from the outer bark the fibres are opened and form a good cloth. This is then folded in the middle, a space left for the arms, the sides sewn to near the bottom, and a slit cut for the head. When old these shirts are as soft as linen; and thus easily are the boatmen of the Beni supplied with clothing.

At the part of the river reached by Dr. Heath on August 12th, in latitude 12° 45′ S., there is danger from savage Chuncho Indians who make incursions every year from the north-west, and kill many of the peaceful Cavinas, dwellers on the Beni. While at breakfast on the 12th the boatmen hastily covered their fires, quickly and noiselessly went to their boat, and crossed to the opposite side of the river. They answered Dr. Heath's inquiry, who was surprised at their evident fear and caution, by pointing to smoke curling up through the forest near the camp, and repeating the simple word *barbaros*—savages. Next day the boat passed the mouth of the Madidi in latitude 12° 33′ 13″ S.; a great tributary which causes a perceptible increase in the quantity of water in the river. The mission of Cavinas is two days' pull up the Madidi.

On the 24th Dr. Heath arrived at Maco in 12° 17′ 25″ S., which is 110 miles from Reyes in a straight line, and 217 from the mouth of the Beni; but by the river it is 234 miles from Reyes. Here the plague of sand-flies and mosquitos becomes severe. On this part of the river there are several indiarubber camps, where the Bolivian collectors are assisted by families of Pacavara Indians, who make plantations of maize, yuca, bananas, and sugar-cane. These people pierce the septum of the nose, and thrust in feathers from each side, at a distance making them look as if they had huge moustaches. In their ears they wear the eye-teeth of alligators. Their complexion is almost white, and the women, if dressed as civilisation requires, would for the most part be beautiful. They differ from other Amazonian tribes by reason of the rapidity of their movements and conversation.

On the 19th the boat passed the outlet of a large lake called the Mamore-bey (from *mamoré*, a fish, and *bey*, a lake), where the *Pirarucu* is

found, and only in this lake, after leaving the falls of San Antonio in Brazil. The banks of the lake are rocky, and in the next bend of the river below it, the rocks jut out, on the south side, nearly to half the width of the river. Rising almost perpendicular above these rocks is a red clay bank 40 feet high. On the 30th Dr. Heath reached a camp where the indiarubber trees were large and numerous, there being over 10,000 trees in a space of five miles square.

Remaining with the indiarubber collectors until September 27th, Dr. Heath then accompanied one of them, Dr. Vaca, down the river. Reaching the camp of Señor Eudara, another rubber collector, his project of continuing the descent of the Beni was encouraged by Mrs. Eudara. When the Pacavara boatmen appeared alarmed at the idea, she said to them "Go with the Doctor, and the Creator will protect you." He continued the voyage in a boat with two Pacavaras. The boat was a most rickety craft, only three fingers' breadth out of the water. On October 6th it was hot and sultry. At 1.10 P.M. a hurricane struck them. Massive trees were wrenched from their sites and hurled many feet; it was a grand spectacle but was over in fifteen minutes.

On October 28th, Dr. Heath arrived at the mouth of the Amaru-mayu, in latitude 10° 51′ 42″ S. On a sand-bar in the middle there were some *capybaras* wallowing on the edge of the river. They merely raised themselves on their fore-feet, and wondered at the strangers. The Amaru-mayu was here 785 yards wide, the Beni only 243. The depth of the Amaru-mayu, at its shallowest place, was 40 feet. Five miles below, the united stream spreads out to a mile in width, the current running three to five miles an hour.

Only twice had civilised men ever emerged from that Amaru-mayu mouth; the troops of the Ynca Yupanqui in the fifteenth century, and Maldonado with his band of gallant youths of Cuzco in 1866.

Encamping late in the afternoon on a beach, the alligators were found to be numerous and much too familiar. Dr. Heath had found the meat of spider monkeys to be tender and excellent, and, to keep his supply safe, he put it at the head of his bed and partly under his blanket. Towards morning he was awakened by feeling something near him, and soon after heard a plunge into the river. Springing to his feet he found that an alligator had carried off his meat. Looking round he saw a large jaguar not 20 feet from him, which had just dug up a nest of turtle eggs. Having finished them, he marched back into the forest.

On the 9th they met a porpoise. Their absence is an indication of impassable falls, so that this creature was a hopeful sign. The mosquitos now became dense and excessively voracious. At 10 A.M. they came to a rapid, but passed between the rocks with ease. An hour afterwards they were stopped by a line of rocks across the river. On the south side a smooth rock was found, and the boat was drawn over to the waters below which were very turbulent. It was with great difficulty

that they prevented the boat from being dashed to pieces. It began to leak badly, necessitating frequent baling. Next day they sighted the hills corresponding to the Palo Grande Fall on the Mamoré, which was already well known to Dr. Heath. He informed the Indians of their position. "Then," said one of them, "there is hope of our not losing our lives. Let us call the fall 'Esperanza' (Hope) since passing that we have hopes of living." Until that moment he had been under the impression that his days were few and numbered.

Dr. Heath's success had been complete. He had been the first explorer to descend the Beni to its mouth. But he had done much more. He had mapped the whole course of the river with the greatest care, measured widths and depths, calculated volume and velocity of current, and taken astronomical observations. He had achieved an exploit for which he deserves the highest credit; and had done geographical work with care and ability, which is of real importance, in the face of great difficulties.

He determined to return to Bolivia by ascending the Mamoré to Exaltacion, a distance of 325 miles. Thence he took the route by the river Yacuma, and once more arrived at Reyes by the 11th of December. He received a fitting reception. Bells were rung, houses decorated, a holiday proclaimed, school children met him outside and escorted him into the town, and there was a special mass. All the people seemed to consider his work as a public benefit.

Dr. Heath's descent of the Beni has given an extraordinary stimulus to the indiarubber trade. Previously 185 men were engaged in collecting on the Beni, who gathered 104,000 lbs. in 1880. Within four months after his return to Reyes there were 644 men engaged, and now there are probably many more. When the Beni and Amaru-mayu are opened for commerce, the yield of indiarubber will be enormous, for all the vast plains are covered with the trees. Coffee, cacao, brazil-nuts, formerly only collected for home use, will be largely exported. Vanilla beans used to be left to rot on the trees. Ipecacuanha, cinnamon, copaiba, matico abound, but never were collected for want of the means of export. This is the region of the chinchona bark richest in quinine. Hides, deer, jaguar, and sloth skins would also be articles of export. This region, too, is the home of the cardenal, of several species of *crax* and *penelope*, of the curassow, of the ant-bear, armadillo, peccary, tapir, and several kinds of monkeys.

In April, Dr. Heath again left Reyes, and ascended the whole course of the river of La Paz, reaching the city of La Paz on July 25th, 1882.

We have now passed in review the efforts which have been made to explore these two great rivers, the Amaru-mayu forming an outlet for the Peruvian city of Cuzco, and the Beni forming an outlet for the Bolivian city of La Paz. Both have been navigated to their mouths once and only once; the Amaru-mayu by Maldonado and the young

Peruvian explorers in 1866, the Beni by Dr. Heath in 1881. Both need further examination, and many important parts of the splendid region which they drain are still unknown. We want an accurate description of the great lake of Rogoaguado. The courses of the Madidi and of the Ynambari remain to be discovered, and of many other great rivers. Here then is a magnificent field for the explorer, as interesting geographically and historically, as it is important from a commercial point of view. There should be a helping hand to the gallant men of Cuzco, the ancient capital of the Yncas, to realise the brilliant dreams of Bovo de Revello. There should be willing aid to the people of La Paz, to the dwellers round the sacred lake, to open their hitherto closed up doors and let in the light of civilising commerce.

In no part of the world can the exploring geographer find a nobler field for his exertions than on the grand rivers which traverse the virgin forests of the Yncas.

Exploration of the River Beni in 1880–1. By Edwin R. Heath, M.D.

Map, p. 376.*

In 1869 or 1870 reports coming from Cavinas that the indiarubber tree grew in that place, two Bolivians, Francisco Cardinas and Pablo Salinas, went there and obtained specimens of the rubber, which they sent to Europe. The quality proving excellent, a few men entered into the business of rubber-gathering, but confined their operations to the region about Cavinas.

On arriving at Reyes, near the river Beni, I could obtain very little information regarding the river I hoped to descend. Ten months' residence at Reyes only made the undertaking appear next to impossible. An opportunity presenting of visiting the indiarubber camps at Cavinas, I left Reyes on August 3rd, 1880, for the river Beni, distant 12 miles.

The first league was open prairie, then came nine miles of dense forest, with mud six to eighteen inches deep. The carts had been sent early on the morning of the 2nd, arriving the evening of the 4th. These carts returning carried rubber, but required four days to reach Reyes. There the rubber is sewed up in hides in packages of 150 to 200 lbs. It is then transported in carts to the river Yacuma 57 miles, then in boats to Santa Ana, and other boats down the Mamoré and Madeira rivers to San Antonio, Brazil, where the monthly Amazons steamers receive it and deliver it to the rubber houses at Para. The time required to transport the rubber from the camps at Cavinas to the port

* This map is from Dr. Heath's own reduction of his surveys. Copies of his large-scale survey maps of the river, made from the originals lent to us for the purpose, are deposited in the map-room of the Society. The reduced map can only be considered as provisional, until the whole of Dr. Heath's great survey can be published on a scale large enough to show the detail of the rivers.

of Reyes varies from 25 to 50 days. One can realise what dread there must have been of the unknown course of the river lower down, to cause such a circuit and loss of time. Reference to the map will assist one in realising this condition of the trade routes in August 1880.

On the 6th, the boat being loaded at 10 A.M. the eight Indians dipped their paddles, and the voyage down the Beni commenced. At 4.17 P.M. the mouth of the small stream Seyuba was passed, and camp was made soon after on a sand-bar in front. The Seyuba rises in mountains at Tumupasa, and the Tacana Indians living there follow it to its mouth, in their yearly visit to the Beni, to fish and collect turtle eggs on the sand-bars. Their indications of the position of the town of Tumupasa, with the mouth of the Seyuba, gave me my first idea regarding the error of the geographical position of that town.

The day had become overcast, and at 8 P.M. the wind suddenly changed from north-west to the south, blowing with great violence. At 9 P.M. the rain began to pour; towards morning it turned to drizzle, with a stiff breeze; the thermometer fell from 94° to 62° Fahr. The 7th of August was passed under shelter. On the 8th, although it still rained at times and the thermometer stood at 62°, orders were given to advance, and the Indians taking off their only covering, a bark shirt, took their paddles, shivering with cold. At 2·45 P.M. the mouth of the little river Tarene, emptying into the Beni from the west, was passed. Its mouth represents the port of the town of Ysiamas. During the afternoon various jaguars were seen on the sand-bars, and camping at 6 P.M. the ground was found covered with their footprints. August 9th, the river and its bends became wider, with a current of one to two miles per hour.

10*th.*—At 7 A.M. the river Enaporera was passed, at 8.56 A.M. the Tequeje, and at 2.20 P.M. the Undumo. These streams, 30 to 50 feet wide at low water and 8 to 10 feet deep, empty into the Beni from the west. The night being favourable, an observation for latitude was made, using a triangle Aust., giving 13° 12′ 15″ S. lat.; the lower part of Reyes being in S. lat. 14° 15′ 56″.

11*th.*—Many jaguars seen to-day. At 4.2 P.M. stopped in the mouth of the river Negro. It was 100 feet wide, 20 feet deep, without current at its mouth. This river had been partly ascended by a Frenchman, who reported the alligators so vicious that he had to return. There being no good place to camp, the descent was continued until 5.3 P.M. The clouds prevented an observation.

12*th.*—While at breakfast the Indians hastily covered their fires, quickly and noiselessly went to their boat, and immediately crossed to the other side of the river. Surprised at this evident fear and caution, they answered our inquiry as to the cause by pointing to smoke curling up through the forest near our camp and saying the simple but expressive word *barbaros*, their word for savages. We learned afterwards that every year this region is visited by a savage and warlike tribe of

cannibals, who live in the north-west, and who kill many of the Cavinas Indians. Current two miles per hour. Camped in S. lat. 12° 45′ 27″.

13*th*.—Killed three large spider monkeys, called by the natives *marimonos*. A large fire being made they were thrown in the flames, which singed their hair and blistered the skin, making it easy to clean off. When scraped they appear like naked white children. An elevated platform of green poles is made over embers, and the monkeys placed entire upon them, where they are roasted. The food is rich, and preferable to all others as soon as one learns to forget their resemblance to human beings.

Early in the morning we passed the little brook called Santa Clara, the old port for the mission of Cavinas. The next bend below has a high red bank, the first high land since leaving Reyes. In former years, a tribe of Guarayo Indians had a village on this high ground. They are now extinct or moved to other parts. At 12.22 P.M. we passed the arroya Vira. About 4 P.M. the river being very low exposed some rocks and made a strong current, needing care to pass. At 4 P.M. stopped at Santa Rosa, the first place where rubber was collected, now deserted for better places below. At 5.15 passed the mouth of the river Madidi in S. lat. 12° 33′ 13″. This is the first important tributary of the lower Beni and causes a perceptible increase in the quantity of the water in the river. Two days' rowing up the Madidi brings one to the mission of Cavinas.

14*th*.—Passed Todos Santos and San Antonio, arriving at our destination, Maco, at 2.8 P.M. in S. lat. 12° 17′ 25·5″, distant in right line 110 miles from Reyes, 117 miles from port of Reyes, 217 miles from the mouth of the Beni. Distant by river from the port of Reyes 234 miles. Time of descent, 58 hours and 30 minutes. I had the good fortune to find the proprietor of Maco ready with boats and men to descend the Beni in search of a new rubber place. Accepting a place in his boat my voyage was resumed on the 16th. At 1.8 P.M. we stopped to take coffee at Sinosino, and camped for the night at San José, another rubber camp in S. lat. 12° 07′ 33″. The bank of Sinosino was nearly 50 feet above the river. The river from Maco begins now to gain direction eastward. Sand-flies, *maruims*, and *tabanos*, black and yellow, make the days intolerable, while the mosquitos by night give no rest.

17*th*.—We passed San Juan, Santo Domingo, California, Etea, San Lorenzo, camping at 12.30 A.M. on the 18th at Santa Ana, the last rubber camp. Here we found a family of Pacavara Indians who were living with Don Fidel Eudara and helping him to collect rubber and make plantations of rice, corn, yuca, bananas, sugar-cane, and build houses. Both men and women pierce the septum of the nose through which they thrust feathers from each side, at a distance making them appear as having heavy mustachios. They wear in their ears the eye-teeth of alligators. Their complexion is almost white, and the females, if dressed

as civilisation requires, would be for the most part beauties. Their movements and conversation are rapid, differing from all other Amazonian tribes I ever met. Their mode of counting is by closing the hands, and as each finger is opened, saying *nata*. When the ten fingers are finished they say *echasu*. Needing more numbers, they repeat *nata* with each toe, and again repeat *echasu* at the close. Thus using fingers and toes they continue until the number is reached.

18*th*.—At 2.20 P.M. we resumed our march, Don Fidel Eudara accompanying us, having two Pacavara Indians as part of his crew. Camped on a sand-bar near the mouth of the Jenejoya river.

19*th*.—Passed the Jenejoya, a river 200 feet wide and 20 feet deep. About six miles up this river is the village of the Pacavara Indians.

About 10 A.M. we passed an *arroya* (little stream), the outlet of a large lake called by the Indians Mamorebey, from *mamore*, a fish, and *bey*, a lake, the *Pirarucu* being found there and only there on the Beni. The banks on the north side at Mamorebey are rocky, and on the south side, the next bend below, the rocks jut out nearly to half the width of the river. Rising almost perpendicularly above these rocks is a red clay bank 40 feet high. On an island, two bends below the clay bank, we saw a number of capybaras feeding. We succeeded in killing one. More than half the weight of the living animal is water, and the meat is unpalatable till dried.

21*st*.—We advanced a little, remaining in our new camp till the 23rd. Señor Vasquez, whose guest I was, resolved to remain at this point. After much persuasion, I succeeded in getting a boat with nine Indians placed at my service. Accompanied by two Bolivians, we resumed our descent.

24*th*.—At 11.35 A.M. we passed the Jeneshuaya, a river equal in size to the Jenejoya. From this point our Pacavara Indians gave indications of fear to go any further down the river, and this fear communicated itself to my companions.

25*th*.—After advancing slowly all day we camped at 5.43 P.M., the Indians refusing to advance further. This was in S. lat. 11° 11′ 29″, 47 hours 16 minutes actual voyage from Maco. My calculations gave the mouth of the Beni as being 143 miles distant in a right line. Pleading did no good, and on August 26th we began to retrace our course up stream, reaching on the 30th unexpectedly a large clearing, where we found Señor Vasquez. He called his new place "Concepcion." The rubber trees here were large and numerous, there being more than 10,000 trees in a space of five miles square. On the 12th of September we again arrived at Maco.

On the 21st three of us started, opposite Maco, to cut our way through the forest on the south bank as far as the pampas. We began at 6 A.M., each taking the lead in turn, and cutting vines and underbush till we were tired. In four hours we reached the open pampas, but it

took us only fifteen minutes to return. This will convey some little idea of travel through the Amazons forest.

I ascended the river a few days afterwards to San Antonio, and there met nineteen Arauna Indians, who lived on the Madre de Dios, north and west of San Antonio. These Indians do not pierce their ears and nose. Small of stature, ugly featured, one could readily believe them to be cannibals. Three years previous, Dr. Vaca, owner of San Antonio, had purchased a boy of this tribe, who now speaks Spanish and serves as interpreter. Through him, as interpreter, we learned they considered the descent of the Beni to its mouth impossible. Dr. Vaca, I found, had provisioned boats, and sent them down the river to select sites for new rubber camps, and afterwards to descend ten days' journey beyond the furthest point I had reached on my former attempt. Dr. Vaca himself was going to follow, on a visit to his rubber station called California, where he had a small boat which he would let me have for my voyage down the river. I was not long in determining to join his party. On the 27th of September, with Dr. Vaca and nine Arauna Indians, in addition to our native crew, we began the downward voyage. Don Antenor Vasquez sent with me one of his Indians, one who had been my body servant on my last voyage. He, the Indian, volunteered to go with me, even though every one tried to dissuade him.

Sept. 28th.—We landed at California. There I found submerged an old boat 15 feet long by 4 feet wide. Bow and stern I could thrust my hand through. Pulling it on land we caulked it as well as we could with corn husks, and plastered mud over them. In this I was resolved to complete the exploration of the Beni. Hastily collecting a few things necessary, we were soon ready to start. The Mobima Indian assigned to go with me and the Indian of Señor Vasquez, was suddenly taken sick, whereon Dr. Vaca ordered another man to take his place. We pushed into the stream the gunwale of our boat one inch only out of water. The boat leaked so badly we were obliged to bale constantly, and it was very doubtful if we should reach the next camp. At 5.50 P.M. we tied up at the camp of Juan Limpias. There we unloaded, and with nails, bark, and mud, repaired our boat. The next day, on launching, it was found dry and good.

29th.—We arrived at Santa Ana and were welcomed by Señor Eudara and the Pacavara Indians. When they comprehended what I proposed doing the Pacavara appeared frightened. They had formerly told me, Señora Eudara serving as interpreter (she having learned to converse with them) that savage Indians inhabited the lower Beni, and advised me to shoot at sight any Indian with long hair. Señora Eudara was the only person in Bolivia who did not throw cold water on the undertaking. She told my two Indians to "go with the Doctor and the Creator would protect them." As we cast off to continue our advance, the Pacavaras, men and women, stood on the bank and murmured "death, death." I

afterwards learned that they put on mourning for a month to counteract the evil effects of having looked upon the dead.

30*th*.—Came suddenly upon the camp at Mamorebey of the boats sent by Dr. Vaca. They had descended to the river Jeneshuaya, made a clearing, planted bananas, and were on their return, indignant at the presumption of Dr. Vaca in sending them to die. Satisfied that I could not persuade them to continue with me, I resolved to go ahead with my two Indians. I was then informed that one of these Indians belonged to Dr. Vaca, and I had to give him up. My other Indian, Ildefonzo Roca, had a raging fever; I told him how matters stood, and asked him if he would return with these men to Maco; he answered "No; I am going with you as far as you go." Procuring some provisions, as soon as Ildefonzo was a little better, we went down the bank to our boat. It was then that Dr. Vaca's agent consented to let the other Indian go also. As we started our boat had only three fingers' breadth out of water.

October 1*st*.—At 5 P.M. we reached Concepcion, and remained here during the 2nd and 3rd, Ildefonzo being sick.

4*th*.—My Indian being a little better we resumed our journey. At 10 A.M. his fever returned, and we had to tie up. The heat, sandflies, tabanos, and the sickness of my best man made the prospects of our expedition look doubtful, but did not cause one moment's hesitation to proceed.

5*th*.—We resumed our voyage, I taking the paddle of Ildefonzo, who lay still in the boat. About 4 P.M. met the canoe of one of the rubber-gatherers who had gone down to a place near the river Jeneshuaya. I took this opportunity of offering my men their freedom to return. This they refused to do, and we bade good-bye to civilisation for many days.

6*th* was a very hot sultry day. At 1.10 P.M. a hurricane struck us. Massive trees were wrenched from their roots and hurled many hundred feet distant. It lasted only fifteen minutes but was grand in its might and effects. The cool air aided us all and for the first time Ildefonzo took his paddle in earnest.

7*th*.—At midday we passed the last point reached on our former descent. Various times each day we landed to explore the country and see if there were any indications of hostile Indians. We camped on a sand-bar in mid-river in lat. 11° 04′ 46·2″.

The 8th found us again advancing. At 8 A.M. we saw a stream emptying in from the south similar to the Jenejoya, to which I gave the name Ivon, in memory of Ivon D. Heath, the companion of the late Professor James Orton. At 12 A.M. we found ourselves at the junction of a much larger stream, the Madre de Dios. Triangulation gave it 2350 feet wide and the lesser stream 735 feet wide. Having met with a large island two bends above with similar appearances, we had left the Beni proper before we realised it, and then it was too late to return and

measure the depth of the Beni. The Madre de Dios was 40 feet deep at its shallowest places. Some five miles below, the river spreads out to a mile in width. The current is now three to five miles an hour. We camped at 4.30 P.M.; alligators abundant and very friendly. Lat. 10° 51′ 42·2″; sat up till nearly 2 A.M. to get an observation. Having had our monkey meat taken from our boat every night by the alligators, I took the precaution of putting the meat at the head of my bed and partly under the blanket. Towards morning I was awakened by feeling something near me, then soon after heard a plunge in the river. Springing to my feet, I found an alligator had carried off our meat. Occupied by this event I did not notice at first a large jaguar not 20 feet away who had just dug up a nest of turtle eggs. Having finished his eggs he marched into the forest. All animals being so tame led me to hope for a safe passage.

9th.—At 6 A.M. we passed a large stream empting from the north. To this I gave the name Orton. This river is as large as the Madidi. At 12.15 P.M. saw a porpoise; a fresh-water species very common in the Amazons, Madeira, Mamoré, and Yacuma rivers. Their absence from the Beni has been considered proof positive of impassable falls above its junction with the Madeira. This lonely creature kept us company all day and part of the next. It gave me great hope of success.

Sunday, 10th.—Passed two large islands; the tabano flies left us. At 10 A.M. we arrived at a rapid, but passed between the rocks with ease. At 11 A.M. we were stopped by a line of rocks crossing the river. Landing on the north side of the main fall, and climbing a high point, I studied the situation: Can we pass? on this side no, unless we draw our boat overland through the forest; with but one knife this was not to be thought of. Crossing to the south side we found a smooth rock, and over that finally drew our boat to the waters below. With great difficulty we prevented our boat from being dashed to pieces by the turbulent waters below. At 6 P.M. we were loaded, and started to pass through the waves raised by the fall; our boat nearly filled. As darkness settled down we tied beside the bank, where a ledge some two feet wide gave sleeping room for my two Indians. I passed the night alternately bailing and inking over my notes and perfecting my map. The hard usage had made the boat leak badly; I had to bale often. This was a night to be remembered; although very tired after paddling 10 hours and working like a servant, I had yet no time to sleep.

As soon as we could see we started on the 11th without breakfast or supper the night previous. About 8 A.M. I recognised the hills that correspond to Palo Grande fall on the river Mamoré, and turning to my Indians I informed them of our position and positive success. This is the point where Bursa in 1846 reported finding so many savages. At 10 A.M. we landed at the mouth of the Beni, at a banana patch planted August 20th, 1879, while ascending into Bolivia.

Our success had been complete. What should we do now? To return by the Beni would be hazardous in case of sickness or accident; therefore we decided to ascend the Mamoré 325 miles to Exaltacion. By this time our food had been reduced to what game we could procure, dried plantains and yuca (now wormy), and yuca meal. To prevent the loss of my notes in case of accident, I wrote out a condensed account, directed it to the owner of the plantation, which I placed in a safe place, and I cut a notice of it in a tree. While stopping for dinner, I again cut in a tree notice of what had been done. That night we slept at the foot of the rapid Lages.

The 12*th* was passed in the same place owing to sickness of one of my men. On the 13th we passed Lages and Palo Grande rapids. At the latter we had our boat submerged, losing all our bananas, rubber clothing, and our last knife; our food, which was sewed up in a hide, and our paddles were carried to the centre of an immense whirlpool, and were saved by swimming to them and pushing them out—one of our paddles was lost. Finding a stick that had once been blocked out to make a paddle, I patiently reduced it to the proper size by aid of fire and a stone.

15*th*.—We passed the falls of Bananeira, which corresponds to "Esperanza" on the Beni.

16*th*.—We passed the rapids of Guajara-Guassu and Guajara-Merim.

17*th*.—Being a windy and stormy day we had to tie up most of the time, the waves being too high for our boat. That night, about 10 P.M., I was obliged to call my Indians, who were sleeping on the bank near by. We had barely time to take our things out, as the boat filled and sank.

18*th*.—After an hour of hard work we succeeded in causing our boat to float. It leaked badly, and until November 5th when we arrived at the port of San Martin, the lower port for Exaltacion, my feet were not dry, and it was with great care we kept afloat. S. lat. 10° 09′ 45″.

We left Exaltacion on the 10th of November, and resumed our ascent of the Mamoré, finally reaching Reyes on the 11th of December. On our arrival bells were rung, houses decorated, a holiday proclaimed, school children met me three miles out and escorted me to Reyes, mass was said, and all seemed to consider my work as a public benefit. Men became crazed over the rubber prospect, and many sold their cattle and lands to go into the business. Before the exploration, 185 men were engaged in collecting rubber on the river Beni, gathering 104,000 lbs. in 1880. Within four months after the exploration that number had increased to 644, and most likely by this time there are from 1000 to 2000 employed. What then must the yield be now? They then only gathered eight months each year, needing the remainder to deliver the rubber at the port of Reyes, to plant their rice, yuca, bananas, corn, onions, &c., and collect palm-nuts. Now they only lose

two months in the working of their plantations, having ten months to employ in collecting rubber. Formerly, coffee, cacao, and brazil nuts were only collected for home use, now they can be exported in large quantities. Vanilla beans were left to rot on the vines. Ipecac, copaiba, cinnamon, coto bark, matico, were never gathered. Hides, deer, tiger, and sloth skins were occasionally shipped. This is the home of the cardenal, matico, tordo curiche, tordo birds; wild turkeys, mutun or currasow turkey, jacumin ostrich, the ant-bear, armadillo, wild hog, and various species of monkeys. The *Victoria Regia*, and numerous varieties of the passion flower are abundant.

Ascent of the Beni and La Paz Rivers.

April 26th, 1882.—Having, as already narrated, descended the Beni from near Reyes to its mouth, I now set out to navigate the upper river as far as the city of La Paz. I left Reyes, accompanied by Mr. Fetterman and his Bolivian wife. We arrived at Rurinabaque, the upper port of Reyes, on the Beni, that night. The port is 24 miles from Reyes by the road, the last 20 miles being through dense forests. Although the main road between the department of Beni and Lake Titicaca, by way of Apolobamba, it is in a very bad state. Between this port and the lower one, called Port of Salinas, or Cavinas, there are three rapid places, and for this reason all rubber from below used to be left at the lower port. That no part of the river might be omitted in my map, I started on April 28th with a canoe and six Indians to visit the lower port. The descent was made in three hours. As we passed the third current I pointed out the place where the raft of Cura Seratia overturned, which mishap cooled his zeal for the further continuance of the exploration. Working early and late, we succeeded in returning by midday on the 30th.

May 2nd and 3rd I occupied in going on mule-back to Tumupasa, which I found in S. lat. 14° 07′ 48″, and San José directly west of this on the river Teuché. The correct positions of Tumupasa, San José, and Ysiamas were determined. Tumupasa is on the side of the Andine chain just above the forests, so that looking eastward one sees only a sea of verdure. To reach San José it is necessary to pass one mountain and descend to the valley beneath. Ysiamas is situated in the forest at the foot of and away from the mountains. Opposite Rurinabaque, on the west side of the river Beni, is a little town, called San Buenaventura. Between this town and Tumupasa, there are fifty-three streams to cross of various sizes. The large ones only are noted on my map. From Rurinabaque, the upper Beni is traversed by rafts made from the *balsa* tree (*Ochroma piscatoria*). These rafts are made by nailing seven logs together by means of strips of black palm. The logs are five to eight inches in diameter. The rafts are from 25 to 30 feet long, and five to seven feet wide. These are cut slanting to a point in front. The logs are chosen with a curve so that the extreme

bow shall be some two feet elevated, thus preventing the submerging of the front as it touches a current or fall. Into the fifth and fourth logs, counting from the centre, strips of black palm are nailed so that their top is one foot above the raft. Midway between these palm sticks stiff poles are lashed across the raft, and upon them a floor of slit bamboo placed and fastened with strips of bark. The same is done to the upper part of the palm sticks; this forms an elevated platform with sides for the baggage and passengers. This platform is called *huaracha*. Two cords of twisted bark the size of a bed cord and 50 feet long, are tied to the bow, and a bit of board six inches long is set in lengthwise and lashed tightly, as a rest for a pole when towing, the Indian *balsero* by this means keeping the raft from the shore. Three men are necessary to manage a raft, two in front and one behind. Each is provided with a pole 18 feet long and a paddle. The raft is poled up stream or towed when sand-bars or the shore permits, and the paddle is used in crossing from side to side as necessity demands.

15*th*.—We loaded and started, having only four balsas and scant number of men. Passing through the narrow "Encañada," a gorge made by a crossing spur of the Andes, we began towing along a sand-bar, but soon camped and rearranged our rafts.

18*th*.—We resumed our ascent in earnest, and passing another narrow gorge through a mountain that has a small hole through it near the top, as if pierced by a cannon ball, from which it derives the name Encañada de Bala, we camped at the mouth of the river Sanis in S. lat. 14° 34′ 51′. Up the stream were a party of men collecting peruvian bark.

17*th*.—Early in the day we passed the mouth of the river Tuichi in estimated lat. S. 14° 36′ 51″, Rurinabaque being in 14° 26′ 21″, and Tumupasa 14° 07′ 48″. My map is correct, though differing from all others. Just below the junction the river is cut up with islands, the western side being a yellow clay bank 70 feet high, and the current very swift. During the afternoon we passed the mouth of the river Quiquibey, and camped just above.

18*th*.—Our progress to-day was very slow, as the river spreads very much and is full of large islands, the river Apichana emptying in on the west. Towards evening we saw in front of us the appearance of five gable ends of the roofs of houses. They were the ends of mountains now nearly perpendicular, made so by the river during high water. We camped just above them. Our rain-gauge indicated 2·756 inch to-day. During the night the river rose so as to float our rafts from the sand-bar where they were drawn, it being necessary to draw the rafts out of water every night to prevent the logs becoming water soaked.

May 19*th* was passed struggling amidst the islands and currents. Being obliged to cross the river where it was wide, rapid, and deep, one of our rafts, carrying the provisions, struck a snag and upset. Every-

thing being securely lashed to the huaracha, and the raft finally brought to shore, we found ourselves deprived of all our sugar and bread, the former dissolved and washed away, the latter soaked and spoiled. A cage full of small parrots was washed away and lost.

20*th*.—We passed the river Sihuapio, and camped at the base of a spur of mountains that here crossing the river, follow down the river, on the east side and then jut out north-east into the pampas, their cut-off ends forming the gable ends referred to as passed May 18th.

21*st*.—Was a perilous day for all. The river was narrow with several precipices 400 feet high, perpendicular to the river. This is called the Encañada de Veo, and at one place where an island obstructs the river, making a difference of level of two feet, there is a fall. This forms an impassable limit to steam navigation on the river so long as the obstruction is not removed. The little streams Sipita and Sama empty in this narrow gorge.

22*nd*.—Opened rainy, and poured all day, with a south wind and thermometer down to 62°. At about 11 A.M. we ascended the river Quendeque (Indian name Tutiquo) to the junction of the river Chapi. There we met some peruvian bark collectors encamped, who received us kindly. Four days' raft travelling up the Quendeque brings you to a point within two and one-half days of Apolobamba by mules.

23*rd*.—The rain having ceased, we descended the Quendeque, and again began the ascent of the Beni. The river having risen some four feet made the current very strong and the labour of our balseros very heavy.

24*th*.—River fell 2½ feet during the night. Early in the morning we crossed the mouth of the river named Caca, on the maps, but called there Huanai. This river is formed by the junction of the rivers Mapiri and Tipuhuani. The river Mapiri has beside it a large plantation of peruvian bark trees, Otto Richter, of La Paz, having one million trees. The river Tipuhuani is celebrated for its gold-mines (placer mines). We camped at the post of the Muchanes Mission, S. lat. 15° 10′ 08″. Fraile Padre Louis Fernandez, Padre Prefect of this mission, has a fine place here where he instructs the Mositana Indians. Our reception was very cordial. His care is over the two missions, Santa Ana and Covendo above, and Tumupasa, San José, Ysiamas, San Buenaventura and Cavinas below.

25*th* and 26*th*.—The river hereabout has few islands, less current, and the mountain chains on each side are separated from each other by a distance of about six miles, the river zigzaging from one chain to the other. Passing the river Iniqua we camped at the little collection of bark-collectors' huts, to which they give the name Iniqua.

27*th*.—Found one of our best men this morning with tetanus, the result of exposure during the rain and cold after the great fatigue of the passage of the Encañada de Veo. At 8 P.M. he died.

28*th.*—About noon we left Iniqua; at the same time a collector of bark, who had accompanied us from San Buenaventura, having fastened side by side two balsas, forming a *callapo*, started down the river. He assured me he would arrive in three days, although we had occupied eleven in the ascent. Another spur of mountains here cross the Beni, forming the Encañada de Iniqua. We camped at the mouth of the little stream Misere in S. lat. 15° 22′ 29″. Leaving this gorge, the river forms a succession of rapids, having two to ten feet fall, in short distances, and then long stretches of river with little current. Thus we passed May 29th and 30th, arriving at 12 A.M. of the 30th at the mission of Santa Ana. Fraile Padre Cesario Fernandez received us with open arms. He took great interest in my maps, and showed a map he had made, which, for one not skilled in the use of the sextant and compass, was a marvel of accuracy; it represented all the localities of the various Indian tribes in Eastern Bolivia and Peru. To cheer our men I paid for a mass, to hear which, early on the 31st we were summoned by the tones of the church bell. The choir were all Mositana Indians, and their instruments—violins, harp, bajones (made of palm leaves, and giving as fine a bass tone as any reed organ), flutes—were made by themselves, and a more solemn and better mass I never witnessed, even though I had often attended the 28th-Street Cathedral in New York city while a medical student. Having spent all the night in fruitless watching for break in the clouds for an observation, I had the satisfaction of a meridian altitude of the sun, which gave S. lat. 15° 30′ 36″. As the Padre and his Indians had often visited Reyes, I was glad to get them to examine and criticise my map, which they did thoroughly bend by bend, and after two hours' careful study told me that it lacked nothing and could not be changed or corrected in any part. The Indians asked the Padre how it was possible that any one passing but once over the ground could be so exact. Above Santa Ana there are many islands, and the river spreads out foaming, becoming more rapid in its current.

June 1*st.*—We camped at Chevoy, a collection of huts of the bark collectors, and June 2nd at Huachi, another similar collection. Here we spent June 3rd, 4th, 5th, drying our balsas clothing and resting our men. Huachi is in lat. S. 15° 39′ 25″, 1422 feet above sea-level; estimated distance from Reyes by river 325 miles, with descent of 662 feet, making an average of two feet per mile; while Reyes, distant 2000 miles from the Atlantic by river, having 760 feet elevation, has but ·38 of a foot per mile. This would be the end of steam navigation after removing the obstruction at the Encañada de Veo, which I have before mentioned. Just above Huachi, the Beni river begins by the junction of the rivers from La Paz and Cochabamba. Railroads could easily be built to those two cities following these streams. A short distance above the junction on the river from Cochabamba is the

mission of Covendo. The ascent of the Rio de La Paz, or Bopi, was now before us with its discomforts and dangers.

6*th.*—At midday we left Huachi. Scarcely had we ascended the Bopi two miles, having risen 73 feet, when a sharp current nearly upset one of our balsas.

7*th.*—We passed the two bad passes of Santa Felicidad (unloading we carried our freight some 300 feet) and Juan de Lana. We stopped to breakfast where the river Cincollachi empties into the Bopi, and where we met bark-gatherers. At night we camped at the foot of the *mal paso* of Tres Bancos. A peculiar botanical division of peruvian bark exists here. Up the ravine of the river from Cochabamba the outer part of the cinchone trees is green in colour, but passing the crest, west of that, it is red.

8*th.*—We passed the Tres Bancos *mal paso Chico* No. 1 and 2, and arrived about noon at an island where a continuous succession of dangerous rapids called mal pasos obliged the unloading of everything and passing the balsas up the rapids, and loading again above. We were all obliged to walk nearly a mile and a half through the rain, crossing both outlets of the river Chispani. At the residence of a bark-collector we passed the night. The lofty mountains close in upon the river, so that there are but six hours of daylight.

9*th.*—We passed the rapid Santa Rosa, the mal paso Ayuna, where there is 15 feet fall in 300 feet of distance, and camped on some rocks, wet and tired, to pass a tedious night, it beginning to rain at 7 P.M. and continuing all night. Unrefreshed we resumed our journey.

10*th.*—We soon passed the river Lerco and mal paso of that name, then Huichini, Huayreruni mal pasos, and at the latter unloaded everything, and with great difficulty passing the rafts. At Chunchu muerto (dead Indian) mal paso the men have to pass the rafts singly up a current some 400 feet long. My raft being last, I had the pleasure of seeing a balsa and two Indians descend this rapid. Naked, with only a handkerchief for breechcloth, with paddle in hand, partly crouching, they awaited each movement of their rafts, and a dip here and there guided it safely where one little false stroke or one unguarded movement would be fatal. These two men turned their raft beside mine and handed me a letter. News having been carried ahead by a man that had left Huachi the day after our arrival, a sick bark-collector had sent these men after me. Leaving my raft and mounting their light unloaded one, I quickly passed the other rafts, and began the ascent of the mal paso Chico, where there is a fall of 25 feet in 200. Our rafts passed the night just above this, while I on foot passed the mal paso of San Fernando, wading the stream of that name. The mal paso of San Fernando is a fall of 8 feet in 20 with a large cutting the channel there narrowed, by projecting mountains on each side, into two parts. I arrived at 6 P.M. at Porto Rico, the residence of

the invalid. An acute attack of rheumatism from exposure was causing him suffering and fear of fatal results, common to these men. His wife was afflicted with a thickened cornea, a disease very frequently met with in the mountains of Eastern Bolivia. At 2 P.M. our rafts arrived, and men exhausted with overwork and poor food.

12*th.*—We advanced a little, and on the 13th we arrived at Siguani, the residence of Señor Cardinas, the owner of the rafts, and with whom we had contracted to carry us to Miguillo, the head of balsa navigation. Here we remained resting and drying our boxes till the 17th. From just below Porto Rico to Siguani, the river bed is wider and the mountains more separated. Just above Siguani they again close in on the river.

18*th.*—We passed the river Chaquitas with its bark huts, and San José, and breakfasted at the foot of Charia mal paso. Here we were obliged to carry everything a distance of 1500 feet. Then we passed Santa Rosa Foriati, Mono-muerto rapids, the river Evenai and its house, and camped at La Asunta, a little village of bark-collectors, in lat. 16° 7′ 16″ S. We have now left behind us the Amazonian forest, and the mountain tops are less densely covered with vegetation. The valley here is wide and open. Across the river is La Asunta de Belmonte, where Señor Belmonte has a large village of his workmen, and plantations of peruvian bark trees. An American, Dr. Gove, lives here during the dry season while working the gold-mines on the river Cajones, a short distance above.

19*th.*—We passed the river Cajones, and afterwards the Quinuni, just beyond which the river runs west and east. We camped at Charabamba. Colton's map represents this as a town, and so it was a few years ago; but being composed of bark-collectors, and the bark having given out, all left—except the great percentage who accepted residences underground. We found only one little hut here. The difficulties of the passes above made it necessary that we should leave here a part of our baggage, to be sent forward by mules as soon as possible; La Asunta having a good mule road, connecting it with La Paz.

20*th.*—A short distance above Charabamba, on the right bank, the mountain is perpendicular to the river, and has a beautiful cascade of 100 feet fall. Near by, the river is narrowed to 40 feet by two projecting points of rock, now six feet above the surface, making an almost impassable passage in high water. To-day we passed what on Colton's map is called Rio Vacas, but is in reality Arcopongo river.

21*st.*—We passed the river Tumanpaya, which comes from the valley of Chulumani. Our river has become quite small and rapid, being a steady pull for the men; the hills more open, and nearly free of trees, rising to 3000 or 4000 feet above us. Passing two very bad passes, we came, towards 3 P.M., to the Encañada de Veniqui. The valley is crossed by a solid rock more than a hundred feet high. Through

this the river has cut a curved channel, leaving the walls perpendicular. Above, the river bed in high water is 500 feet wide. A sand-bar throws the river against the obstructing rock, which, turning its course, throws it directly against the side of the mountain, where it ascends to a height of 15 feet, crests and falls over, then rushes whirling into the narrow channel, and thus forming the most difficult and dangerous pass on the river. Here we nearly lost a balsa, and Mr. Fetterman his wife. We now meet maguey plants and the molle tree. The sides of the hills and sand-bars show traces of saltpetre. The mountains now have only grass on their summits instead of trees.

22*nd*.—We passed the river Zuri. Three miles above its mouth the river Vacas joins with the Zuri, forming the Zuri junction.

23*rd*.—We pulled our balsa out on dry land for the last time near the mouth of the river Miguillo, lat. 16° 29′ 32″ S. We now took mules and went west over the mountains into the Tumanpaya valley, and stopped at Irupana. Observations of a star in the south, another in the north, and a meridian altitude of the sun gave for Irupana 16° 29′ 09″ S. lat. At Miguillo we found 3360 feet elevation, having risen 1125 feet in a distance of 150 miles. Although we had been from May 15th till June 23rd in the ascent from Rurinabaque to Miguillo, it only takes seven or eight days to descend that distance.

July 21*st*.—We left Irupana with mules, and, returning to the river-bed, continued our ascent.

22*nd*.—We passed the Chungamayo, a stream coming from the snows of Illimani, whose snow-capped summit can be seen as we look up that ravine.

23*rd*.—We passed through the narrow gorges that the river has cut through, and passed the river Caricata, which was our extreme point south. We now direct our course to the north-west.

25*th*.—At 2.30 P.M. we arrived at La Paz, and thus brought to an end our ascent of the Beni and La Paz rivers. The Bolivian Government were much gratified with my work. La Paz has an elevation 11,985 feet.

Previous to the reading of Mr. Markham's paper,

The PRESIDENT said he need hardly remind the Meeting that Mr. Markham won his geographical spurs in Peru; for it was during his visit to Lima and Cuzco in 1853 that he laid the groundwork of his geographical reputation. He revisited the country in 1861, on a mission from the Government, in order to obtain living chinchona trees for transplanting in India. No doubt many present had read his account of that journey, and he (the President) could confidently recommend those to read it who had not as yet done so. Several papers had been read before the Society by Mr. Markham on this interesting country, one of which was on the distribution of the various primitive Peruvian tribes, and he had shown his continued interest in it by writing a history of that unfortunate war which had lately raged between Peru and Chili. The paper divided itself into two parts: one was a history of the exploration of the Amaru-mayu, the other the history of that

of the Beni. Our knowledge of the Amaru-mayu was derived from notes of the travels of various Peruvian discoverers; the history of the Beni was derived chiefly from the recent journey of Dr. Heath, an American gentleman who had been employed as medical officer to those who were engaged in opening up the country under the direction of Colonel Church, who, he was happy to say, was present. Three years ago Mr. Minchin read a paper on Bolivia, a country which seemed to be endowed by nature with every element of future prosperity and greatness. The main feature, however, of the present paper was the account it gave of the sources in the Eastern Andes of the two great tributaries of the Amazons, which themselves were equal to the mightiest rivers of the continent of Europe. Colonel Church had been engaged in one of the greatest works connected with the future civilisation of South America that had ever been undertaken. They were aware that shipping of a very large size could ascend the Amazons and the Madeira until stopped by certain falls. Those falls alone prevented shipping finding its way to the very foot of the Eastern Andes, and it had been the labour of a considerable part of Colonel Church's life to discover means for overcoming that great natural obstacle.

After the paper,

Colonel G. E. Church said that a year and a half ago, when crossing the Chimborazo Pass of the Andes, he met an old woman and her daughter, each with a large bundle of faggots on her back. As he jogged along on his mule he conversed with the woman about the condition of the common people in Ecuador. The finest locomotive machine of which she had any idea was a mule. Finally he gave her a two-real piece, about tenpence. She dropped her bundle of faggots, and looked at him from head to foot, and said, "What country are you from?" "From the United States." "How far is that from here?" "Well, that is about 1500 or 2000 leagues." She looked at him in wonderment, and said, "How young you must have been when you started!" When he listened to Mr. Clements Markham's paper, ranging as it did over a vast space, and the marvellous accuracy of its detail, and the profound knowledge of geographical subjects, he felt like that old woman—"How young he must have been when he started!" But Mr. Markham had been kind enough to leave a small part of the field without giving them the benefit of his knowledge of it, and he (Colonel Church) would say a few words with regard to it. The Andes, stretching along the west coast of South America, had their greatest counterfort towards the east, on the parallel of Cochabamba, and extending 123 leagues eastward from that city to the town of Santa Cruz de la Sierra, on one of the affluents of the Mamoré. On the western escarpment of the Andes the slope was not so steep as on the east. The clouds from the Atlantic Ocean became drier and drier until they reached the eastern base of the Andes, against which they beat, and produced very severe results. They rushed through great gorges, at the base of which there were great numbers of falls and rapids, until they reached the plain of the Beni. He believed that vast region was at one time a lake, bounded on the north-west by a range of hills which separated the Amaru-mayu from the Purus river, and having its north-eastern boundary on the Brazilian side. The northern and eastern side was Brazilian territory. On the south the lake must have met the great counterfort of the Andes, and been separated by it from the head-waters of the Paraguay river. The lake must have been held in place on the north by the falls of the river Madeira. One of his reasons for believing in this lake was that the upper course of the Purus river ran at a lower level than the Amaru-mayu; and if there were not a line of hills separating it from the Purus, the Amaru-mayu would probably have found its way into the Purus, as a great many geographers believed it did. This vast lake must have had an area of about 200,000 square miles, but as the mountains were denuded it was filled with detritus, so that to-day there was an enormous plain, composed of

fine sedimentary deposit, with scarcely a pebble for hundreds of miles; so much so, that the Indians in Exaltacion begged their friends, when they were going to the banks of the river Mamoré, to bring back a stone, so that they might see what a stone was like. Well, the lake was not entirely filled up, for even now about 40,000 square miles of the district were annually overflowed to a depth of from two to five feet for three months in the year. South of Trinidad, up to the base of the counterfort of the Andes, an enormous overflow takes place, leaving a sedimentary deposit of great fertility, just as in the case of the Nile. A very curious thing was noticeable there. There were a great many ant-hills in this district; they were little pyramids ranging from three to eight feet in height: during the flood season the ants retire to the top to get clear of the water. But how did the ants know that there was going to be a flood? All the inhabitants of the district would state that, when there was going to be an extraordinary flood, the ants went to work, and put an extra storey on the top of their house. The name of the Amaru-mayu was derived from the Quichua language; but he understood that the Takana tribes, five in number, who lived along the line of the Amaru-mayu, called it the Mayu-tata, or the "great father river." Mayu-tata was very similar to Manitou, in the North American tongue, and meant exactly the same thing. The word *tata* meaning "father," was also found in New Mexico and the Puebla language of North America, several thousand miles away from the Amaru-mayu. He might be allowed to diverge a little and remark that the tribes in New Mexico and the United States called the Apaches and Comanches, had the termination *che* which meant "people," while in southern South America there were the Tehuelche, Pehuenche, and Huelche tribes of Patagonia, having the termination *che* which meant the same thing. That was a very remarkable circumstance and was worthy of the study of ethnologists. He had personally sounded the Mamoré until it struck the falls of the Madeira. North and east of Cochabamba there were three large branches,—the Securé, the Chaparé, or middle river, and the Chimoré. The Securé was examined by D'Orbigny, the French naturalist, in 1845. D'Orbigny was the first discoverer of the *Victoria Regia*. The Chaparé was explored by Lieutenant Gibbon of the United States Navy, in 1854. He (Colonel Church) passed along the great counterfort of the Andes and descended the mountains to Santa Cruz de la Sierra. About ten leagues to the east of Cochabamba was the Rio Grande. That river was navigable, and he had it explored with a steam launch in 1873. They were able to ascend to within ten leagues of Santa Cruz de la Sierra. He himself explored the Mamoré. He commenced his soundings at the mouth of the Rio Grande in the dry season. The river was about 1200 feet wide and 10 feet deep. It was a gentle inclined plane to the first rapid of the Madeira, and gradually increased to a depth of 40 feet and a width of three-quarters of a mile. It was a noble stream running from two to three miles an hour and presenting every facility for splendid navigation. Coming into it from the eastward was the river Guaporé, the boundary-line between Brazil and Bolivia. There was a Portuguese fort there, built in the last century out of stone obtained at the falls of the Madeira, and taken up stream with great difficulty. At that time, owing to the wars of the Spaniards, the Portuguese, in order to communicate with their Matto Grosso possessions, annually sent fleets of canoes carrying about four tons each. These canoes were dragged round the falls. In 1882 he (Colonel Church) descended the La Paz river from the south of La Paz to about 130 miles, and then embarked on rafts to go down to Reyes. Along the La Paz river, nature was at work as in prehistoric times. La Paz was situated in a gorge 1000 feet below the plain of Titicaca. As the city was approached nothing but the roofs of houses was seen. One thousand feet represented the visible thickness of a vast mass of drift matter, and as the river was descended, lateral streams were met with which were caused by the

terrific storms which sometimes raged in the Andes. These storms were local. They swept down vast masses of detritus, and dammed up the main river, which rose against the dam, overflowed it, and swept the detritus again across the stream from which it received it. He had seen those beds of detritus at least 400 feet thick with gigantic boulders weighing many tons, and the stiff clay of the formation cemented the boulders together almost perpendicularly. A story was told of one of the Incas of Peru, in the mythology of the Indians, which he thought rivalled anything ever done by Zeus. It was said that one of the Incas having had a quarrel (it was not said with whom—perhaps it was his wife), got very vexed, and sweeping his hand round with a royal gesture struck the top of Mount Churuguella, about 18,000 feet high. He knocked the top off to the south-west, and there it stood to the present day, the beautiful cone of Sajama, snow-capped, 19,000 feet high. In crossing from the La Paz river over to Chayanta, across the mountains, he discovered that the mule traffic in the range had worn out the road to a depth of six or eight feet. There was a terrace there covered with about five feet of vegetable earth, and gigantic forests on the top of it. All that country had been densely populated in very remote times, and was sometimes terraced right up to the snow-line, showing how precious the ground was and the labour that was expended upon it to make it useful. The depth of the terrace below the surface, and the forest trees above it, showed that the population must have resided there many centuries ago. The inhabitants of the country which was the subject of consideration that evening numbered perhaps from two and a half to three millions, mostly living on the higher lands and just over the eastern slope of the Andes. The city of La Paz, for instance, had 80,000 inhabitants, and Cochabamba 60,000. They were a very peculiar people. At each post-house where he stopped he noticed blood on the walls of every bedroom, and blood at the entrance, and it was a long time before he could discover what it meant. At last he was told that it was the custom every year to let the post-houses to different persons, who immediately whitewashed them and then killed a goat or a sheep and sprinkled the blood over the walls with the object of bringing luck to the post-house during the year, and "giving the walls something to eat." There was another curious custom. Riding along the roads among the Andes the traveller found little piles of stones ranging from six inches to one foot high, apparently placed on one another with the greatest care. It was very difficult to ascertain why that was done; but he discovered that, when an Indian started off on a journey with his mules or llamas or jackasses, and expected to be absent five or six days, he wished to know whether everything was going on all right at home, and so he formed these little piles of stones. The more jealous he was, the more delicate he made the piles, and if when he returned home the pile of stones had fallen down, then good-bye to all domestic felicity. In former times Jesuits occupied all the country up to the Madeira, and even towards the Madre de Dios. They crossed the Gran Chaco, and formed thirteen different settlements along the Mamoré, the San Miguel, the Magdalena, and other tributaries, and succeeded in doing great and good work. The action of the Spanish Government in 1767 in driving the Jesuits out of the country had almost blotted those settlements from the face of the earth. In 1871 he ascended the mouth of the Beni for a few miles, but did not go up to the first fall. It was a grand river, and in the rainy season he should think it carried more water than the Mississippi. In ascending the Madeira, five falls were met with above the mouth of the Beni, and fourteen falls or rapids below it. Among the worst of the falls was the Cauldron of Hell; that was the rapid where Colonel Maldonado was wrecked, and he (Colonel Church) was very nearly wrecked there. It was customary in passing those falls to drag the canoes over the rocks. After about two or three days of terrible work

they got to the lower end of the falls, a distance of about two miles. As the traveller approached the fall he saw a vast wall of foam nearly crossing the river, and in the midst of the rapid on the right was an immense whirlpool, and on the left another. The river swelled up in the middle for about the width of 40 or 50 feet. He had had a little experience of his Indian crew at the mouth of the Beni, where he had gone over a fall, and stove his canoe to pieces, and had to use threats to keep his Indians in the canoe. He expected, like other travellers, to haul the canoe overland at the Cauldron of Hell; but he got caught in a current, and found himself being hurled against the wall of foam. But just before reaching it an eddy took the canoe and carried it towards the eastern shore, around the wall of foam, and confronting the whirlpools. He showed his revolver, and compelled the captain of the canoe to steer as he was directed. His crew consisted of twelve Indians, speaking five different tongues, and not understanding each other. They reached the lower end of the Cauldron of Hell in two minutes, as near as he could judge, instead of two days, and they did not upset either. Just below the Cauldron of Hell they saw forty or fifty savages standing on the bank of the Madeira. Those savages were always very good-natured if one knew how to treat them; but if the traveller did not know how to treat them, he was very apt to get scalped or murdered. He caused his canoe to be steered straight for the bank. The savages sent the women and children into the bushes, got their bows and arrows ready, and had them bent. He held out his hand towards them, jumped ashore, and walked up the bank. They lowered their bows and arrows, shook hands with him, and he gave them some fish-hooks, with which they were immensely pleased. In return they gave him large bunches of bananas. He invited the chief and four or five of his men to go off to an island and dine with him. It was the strangest dinner-party he ever gave. Those fellows were clothed in what Mark Twain would call "smiles." The young chief was about thirty years of age; his hair was cut across his forehead, and hung loosely down his shoulders; two capivara teeth, about as long as a man's finger, were passed through his ears, and were held in place by a string which came under his chin. Around each wrist was a band of black palm leaf, and round each ankle, which set off the contour of his finely developed limbs. His eyes were everywhere, and he seemed to see everything. In the United States, when a person admired a man, the first thing he did was to say, "Will you take a drink?" That was the first thing he said to the chief. He had some rum which he had purchased at Santa Cruz de la Sierra, which had not been diluted. He poured out a glassful, and handed it to the savage. The chief handed it back to him, and intimated that he ought to taste it first. He did so, and the chief then put it to his mouth, and at the same time put his left hand to his throat, and as the liquor poured down his throat, burning all the way, he said, "Ugh, ugh, ugh." Then he struck himself on the breast, and said "Yocaré!" meaning his tribe. He knew two or three words of Portuguese, and said, "Capitão," and very unexpectedly he drew off like a prize-fighter, and struck him (Colonel Church) in the chest, and said, "Grand capitão." They had a very charming dinner-party.

The Incas certainly carried their conquests to the Beni river, south of Cavinas. A road about 25 feet wide could be traced for some distance towards Cuzco from there and he had traced the Inca occupation to the slope leading down to Santa Cruz de la Sierra, and into the Argentine Republic, 400 miles south of the Bolivian frontier. The picture-writing around the Madeira falls was very strange, and he had seen very similar writing in New Mexico, made by the Apache Indians or their predecessors. The rainfall in this district was from 84 to 90 inches per annum, and that might be said to be the average rainfall on the southern side of the Amazon river. On the northern side it was heavier, at Panama being 126 inches. The health of the country

was as good as that of any semi-tropical or tropical country. Of the twenty-eight engineers sent out in one party, and remaining eighteen months at the fall of San Antonio, twenty-seven returned in perfectly good health. He supposed that the object of the Geographical Society was to be the pioneers of progress and civilisation, and to lead the way to enterprise; he might therefore be pardoned if he said something about the work which was projected around the falls of the Madeira to open up a district which was twice the size of France. The work was originally organised under concessions from the Governments of Bolivia and Brazil. The money was raised and put in trust for it, and the whole thing was going bravely on, with 1200 men at work, a locomotive running over the first five miles of line, 40 or 50 miles of material on the ground, and ocean steamers running right up to the rapids of the Madeira, 1600 miles from the sea, when opposition succeeded in wrecking the enterprise, and dividing the money among the subscribers. That was in consequence of the revocation of the concessions made by Bolivia. An agent was sent to Bolivia, with instructions to obtain the revocation, and his success was only too great. But the enterprise was not dead. The rivers along which the whole commerce would pass pointed straight for London and Liverpool. To reach that beautiful valley by any other route would cost from 50*l.* to 60*l.* per ton for all the goods taken there; but when once the falls of the Madeira were avoided, as rich a field for trade and emigration would be opened up as could be found anywhere in South America. Recently he was in Brazil, where he was received most kindly by his Imperial Majesty, Don Pedro, whose grand qualities as a man and monarch needed no eulogy from him, and the Emperor told him he considered that enterprise to be first in importance in his empire. The largest and best corps of engineers ever organised in the country had recently been sent to the falls of the Madeira, not only to re-examine the whole of the projected line of railway, but to ascend the river, and make a railway survey from the head of navigation to the capital of the great province of Matto Grosso. On their return new concessions would be given to reorganise the enterprise, and they would be given under the guarantee of the capital by Brazil, which would insure the raising of the necessary funds. That would open up the whole of Southern Peru, two-thirds of Bolivia, and the whole western part of Brazil. All that was required was the extension of the railway from Cuzco down to the Piñi-Piñi, or to the head of the navigation of the Amaru-mayu, to open up an interoceanic route which for beauty of scenery and interest to the tourist had few equals on the face of the globe.

Mr. Christy asked Mr. Markham if he could tell what variety of the indiarubber tree it was from which the indiarubber was obtained.

Mr. Clements Markham replied that it was pretty clearly established that the trees on the western slopes of the Andes, where the forests reached the Pacific Ocean, belonged to the genus *Castilloa*, and that all within the Amazons basin on the eastern slopes were the genus *Hevea*.

Mr. Christy said that both those indiarubbers were of the greatest importance to commerce. There were now many branches of trade really languishing for want of reliable sources of indiarubber. Many indiarubbers were brought to this country, but it was found that they were collected from young trees, and did not harden properly; but the rubbers coming from Brazil were of extreme importance. He could corroborate the remark as to the large quantities of gold found in the country. He had lately had stopping with him a gentleman who had resided near La Paz, and who told him that great profits were obtained there by dealers in the gold collected in the district.

Sir Harry Verney said he was extremely glad to hear from Mr. Markham that his old friend General Miller had done something for the increase of geogra-

phical knowledge. He knew him in his ministerial capacity and as an administrator both in Cuzco and on the Pacific coast, but he was not aware, until he heard it from Mr. Markham, that he had done anything towards the extension of geographical knowledge. He was one of those "Englishmen abroad" who did much to ennoble the character of the English nation in South America. No one contributed more greatly than General Miller to the freedom of the South American countries from the Spanish rule and to improve the character of the population. He recollected Sir Woodbine Parish at Buenos Ayres telling him what was corroborated by Colonel Church—that the Incas had descended the rivers and had come down the La Plata; that they had met Indians from the Amazons, and that they had fought in the vicinity of the two rivers. Mr. Clements Markham had referred to the different navigators of the Amazons, but he did not mention that our own countryman Lieutenant Lister Maw in 1828 or 1829 obtained permission to leave his ship at Callao, and came down the Amazons. He told him (Sir Harry Verney) that 4000 miles from the mouth of the Amazons there was an enormous basin where two large rivers met, and that the basin was large enough to hold the whole British fleet. He rejoiced to hear what Colonel Church had told them with regard to the probability of commercial enterprise penetrating into those interesting and most remarkable districts; and in the high character of the present Emperor of Brazil they had a guarantee that every opportunity would be given for the extension of commerce and civilisation in that productive region.

The PRESIDENT said it was sixty years ago that Sir Harry Verney rode from the eastern coast of America across the Andes to the western shore. He wished to ask Colonel Church what became of the inhabitants of the vast level plain which he had spoken of during the three or four months when it was flooded.

Colonel CHURCH answered that there were no inhabitants in the greater portion of it. At Exaltacion, an old Jesuit mission, there were 3000 inhabitants, and the streets of the town were only one foot out of water in the wet season, and 20 or 25 feet in the dry season. All over the district there were little rises in the land generally occupied by all kinds of waterfowl and animals that sought shelter there while the intermediate parts were flooded. The line of the Mamoré river had a fringe of trees. The animals were very numerous. The greater portion of the population of Bolivia were on the slopes of the Andes, but nothing produced in the Mocos valley had been of any use except for home consumption, on account of the difficulty of transport over the passes of the Andes 14,800 feet high.

The PRESIDENT said that in listening to the description given in Mr. Markham's interesting paper, and to Colonel Church's original observations, he was struck by the recollection of Buckle's remarks about the country, in which he insisted upon the effect of natural causes upon the development of the human race. In speaking of South America he said that was a case where the prodigious proportions of nature actually overpowered and crushed the efforts of man: the forests were so vast, the streams so broad and rapid, the mountains so huge, that nature was too much for him to contend with; and certainly when it was considered that the country had been for 300 years in the possession of a race so valiant and enterprising as the Spanish were in olden days, of the continuance of which qualities there was ample proof in the story of Peruvian explorations on the Amaru-mayu, it would seem as if the explanation given by Buckle was the only one which could account for the obscurity of a land which in many respects had so much to attract enterprise. At the same time, if there were many Colonel Churches and Dr. Heaths in the world it would not be long before a great deal more was known of Bolivia, and Buckle's philosophical views negatived by the results of experience.

Departure of the Dutch Arctic Expedition, 1883.

The sixth voyage of the *Willem Barents* to the Arctic Seas is specially important, because its principal object is to bring succour to the Danish exploring vessel *Dijmphna*, and to the steamer *Varna*, which were beset in the Kara Sea, and of which nothing has been heard since last September.

The Dutch Arctic Committee have shown most praiseworthy continuity of purpose in organising the annual voyages. Their first conception, and the enthusiasm which led to the subscription of sufficient funds in 1878, were due to the energy and persuasive eloquence of young Koolemans Beynen, whose melancholy death was so deeply regretted by all geographers. His was a noble character, and he was inspired with the true spirit of Arctic research. Our accomplished honorary associate, Commodore Jansen, who was very warmly attached to young Beynen, has since promoted the continuance of the work, and has brought his varied experience and great nautical knowledge to the counsels of the Dutch Arctic Committee, which is composed as follows:—Fransen van de Putte (*President*); Commodore Jansen (*Vice-President*); Baron Wassenaer van Catwyck; Captain de Bruyne, Captain Bruekhuysen (former commanders of the *Willem Barents*); Charles Boissevain; Mr. Schorer (*Royal Commissioner of North Holland*); E. N. Rahusen.

During the first voyage, in 1878, when De Bruyne commanded the *Willem Barents*, and Koolemans Beynen was his second, a very complete reconnaissance was made of the Spitzbergen and Barents Seas. In 1879, when De Bruyne was again in command, Franz-Josef Land was for the first time sighted in open water. The voyages of 1880 and 1881 were commanded by Captain Bruekhuysen, that of 1882 by Captain Hoffman. When Mr. Leigh Smith retreated from Franz-Josef Land in his boats, the *Willem Barents* was the first vessel he sighted; and when the *Hope* got on shore, Sir Allen Young received effective assistance from the *Willem Barents*, whose carpenter, Mr. Latjes, worked hard at the needful repairs. Every year the Dutch explorers, by their numerous observations, their soundings and dredgings, and their other work, have contributed usefully to the advancement of geographical science. At the same time a number of officers and men have been trained to ice navigation. The naval officers are only allowed to serve for two years continuously, so that there is a regular succession of them acquiring Arctic experience. When an officer has served two years the Arctic Committee presents him with a handsome piece of plate, about eighteen inches high, called the "Barents Cup." The figure of Barents holding the Dutch flag stands on a globe, forming the cover and bowl, which is engraved with the old chart of Barents. The whole is supported on silver dolphins. The men who have served two years receive silver tobacco-boxes of antique pattern.

For the voyage of 1883 the *Willem Barents* was carefully overhauled, and found to be thoroughly seaworthy and as sound as ever: as well adapted to encounter the ice as any sailing vessel that ever entered it. Her commander is Lieutenant Dalen, who was first-lieutenant in the last voyage, a steady and efficient officer. Under him are three young lieutenants, who go out full of enthusiasm for the cause of geographical discovery. Lieutenants J. and M. Kluit are twin brothers, and the other is Lieutenant Phaff. The surgeon and naturalist is Dr. Waelchli, and Mr. Grant accompanies his Dutch friends as photographer, for the fourth time. Our indefatigable Associate has now made seven voyages to the Arctic regions, of which four were on board the *Willem Barents*. Latjes, the carpenter, has been every voyage, and of the crew of seven men and a boy, three belong to the Navy. One lad is sent out by the old town of Enckhuysen with a view to promoting enterprise among the fishermen of the Zuyder Zee, and he is to receive a prize of 100 gulden if his commander reports well of him.

It will be remembered that last year a party was sent out, under the auspices of Professor Buys Ballot, of Utrecht, to form a Dutch meteorological station at Port Dickson, near the mouth of the Yenisei. The expedition was accompanied by Lieutenant Lamie, of the Dutch Navy, who had formerly served in the *Willem Barents*, but the steamer *Varna*, which took out the observers and their stores and apparatus, was commanded by a German. The steamer *Luisa*, under Captain Burmeister, was also chartered to take out some of the materials for the observatory. The *Luisa* appears to have parted company near the Kara Strait, and reported that the *Varna* and the Danish exploring vessel *Dijmphna*, commanded by Lieutenant Hovgaard, were beset in the ice near the middle of the Kara Sea, and in sight of each other. They were last seen by the *Luisa* on September 26th, 1882. Much anxiety is felt for the safety of the *Varna*, as she was not fortified for ice navigation, and was very deep in the water.

The possibility of succouring these vessels has received much attention from the Arctic Committee. The instructions to Lieutenant Dalen are that the *Willem Barents* is to proceed to Vardoe, and then to make the best of her way to Waigatz, and attempt to enter the Kara Sea by the southern strait. If the strait is closed she is to go to Archangel to see whether there is any news of the missing ships, and to communicate with the Committee. She is then to return to the Kara Strait, and to search the east coast of Waigatz and Novaya Zemlya for boats or men. If nothing is found, and there is no news, she is to attempt to reach Port Dickson. In the event of favourable tidings, and of news being received that the *Dijmphna* and *Varna* are safe, an examination of the Kara Sea is to be undertaken, and collections are to be made there, as in the Barents Sea during former voyages.

The *Willem Barents* was ready for sea, and was to sail on Saturday,

the 5th of May. In the previous evening the Arctic Committee gave a farewell dinner to the officers. Commodore Jansen presided, and Mr. Leigh Smith and Mr. Clements Markham (Secretary R. G. S.) were among the guests. Mr. Leigh Smith described his feelings of relief and joy when he first sighted the *Willem Barents* at the end of his long and perilous retreat from Franz-Josef Land, and, in memory of the event, he presented the mess of the Dutch Arctic vessel with two silver cups. Mr. Markham, in the name of the President and Council of the Royal Geographical Society, expressed warm sympathy and admiration for the perseverance and energy of the Dutch Committee, and for the skill and gallantry of the officers and crew of the *Willem Barents*. Next morning the little vessel left Amsterdam, and proceeded down the canal amidst great enthusiasm. The burgomaster stood on the quay, surrounded by a crowd of people whose hearty cheers mingled with the strains of a military band. Several members of the Committee, Mr. Leigh Smith and Mr. Clements Markham, continued on board the *Willem Barents* as far as Ij-muyden, where Sir Allen Young, who had been detained, also came on board. Two racing-boats, manned by young students of Utrecht and Leyden, pulled all the way, one on each side, and every vessel in the canal kept up the cheering with hearty goodwill. At Ij-muyden the guests were transferred on board a steamer commanded by Captain de Bruyne, the first commander of the *Willem Barents*. The two vessels went out of harbour together, and, after proceeding with the exploring vessel for a short distance, the steamer parted company with three ringing cheers. The sea was smooth, and the *Willem Barents* made sail to a fresh breeze. She commenced her adventurous voyage, in which the cause of humanity is linked with that of science, under the happiest auspices.

GEOGRAPHICAL NOTES.

Progress in North Borneo.—The diary of Mr. L. B. von Donop from July 30th, 1882, to January 17th last, recently published in the *Ceylon Observer*, contains many details of interest as to the topography and products of the central and western parts of the new North Borneo territory of Sabah, though this observer's explorations were confined to the region already broadly sketched by the late Captain Witti. His first journey was from Kudat in Marudu Bay, in the extreme north of the territory, to Abai on the west coast, from which an excursion was made to the country watered by the Jampassuk. This consists of undulating hills covered in many instances with fodder-grass as high as a man's head; the soil appeared very rich, coffee and paddy being grown, and a growth of fine timber-trees round the chief's house presented the appearance of an English park. From this point Mr. von Donop struck south towards Kinabalu, passing through a very hilly but cultivated

country to Tambutuan and Kian. A projected journey to Kinabalu from the latter place had to be abandoned, but the ascent of a neighbouring ridge 4700 feet high afforded a good view of the intervening thickly-wooded ranges and valleys. Arrived at Tuan, range after range was seen, mostly with jungle on the top ridges but cultivated beneath, and after crossing the Yaggo river the rich and promising Danoe plain was reached, different aspects of Kinabalu being observed as the route worked gradually round it. Mr. von Donop finally reached the Kinarum river after passing various villages and finding a succession of ranges and well-watered valleys, and he then struck north to Bongon, returning to Kudat by boat. In September he again proceeded to Kinarum to join the late Mr. Frank Hatton, and after excursions to Bongon and various points on the Marudu river, once more made for Kian, spending some days in the Sissio country, on the northern side of Kinabalu. This, with the Tambuyukan ranges on the east, was found to comprise many thousand acres, varying in elevation from 700 feet to 4000 feet, and of a very promising nature. A partial ascent of Tambuyukan was made, and the land found available for cocoa, pepper, and Liberian coffee on the lower elevations, and tea, chinchona, &c., on the higher. In the beginning of October, Mr. von Donop started from Kinarum eastward for the Sugut country, returning to Kudat northwards by the Benkoka. From his account and other notices of North Borneo, it appears that a considerable part of the available land in Sandakan Bay has already been taken up for agricultural purposes, Mr. E. Major's company having taken 50,000 acres, Mr. A. Major 40,000 acres, Mr. de Lissa 20,000 acres, Mr. Lo Yuen-Yuo's Shanghai company 10,000 acres, Messrs. Wilson and Smith, tobacco-planters from Deli, 10,000 acres, &c. Buildings also are being rapidly raised, the families of settlers who have arrived seeming to find the climate healthy; and the rate of progress may be estimated from the fact that an official newspaper was started in April under the name of *The North Borneo Herald*.

The Republic of Ecuador.—In June 1881, Colonel G. E. Church, then at Quito, received instructions from the United States Government to supply a report on the geography, commerce, and general condition of Ecuador, which he submitted in the following September, his information being derived almost entirely from original sources and personal observation. This Report, for a copy of which we are indebted to him, forms Executive Document No. 69, 47th Congress, 2nd Session, ordered to be printed February 27th last; and is important as a recent account of the Republic by a competent and keen observer. In discussing its geographical limits, Colonel Church points out that all the boundary lines are untraced, except that defined by the Pacific, so that the exact area of the country is unknown, though it may be estimated at about 150,000 geographical square miles; the quoted ancient limits, all that exist in fact, are deficient in mathematical data, and leave "as fertile a

field for discussion as any Spanish-American could wish." The area, as estimated by Colonel Church, will be observed to differ materially from that given by Behm and Wagner, which is 643,295 square kilometres, or 187,800 geographical square miles (248,380 statute square miles).

Colonel Church, in sketching broadly the geography and topography of Ecuador, divides it into three great sections by the double line of the Andes, composed of the Pacific coast and the inland ranges, which run nearly parallel from 40 to 60 miles apart. The latter throws out numerous immense and long spurs on its eastern face, between which rise great affluents of the Amazons, whilst the former possesses only short and precipitous spurs, contributing to the river systems of Western Ecuador. Between the two ranges lies a plateau, 7000 feet high on the Colombian border, rising gradually to 9500 feet at Quito, and more or less maintaining that elevation to the Peruvian frontier, where it descends to 7000 feet. On this plateau are short and broken ridges, sometimes almost connecting the two ranges from east to west, and cutting it into eight subdivisions, themselves more or less scored by cañons, small rivers, &c., and possessing but a small area of stunted forest lands. Enumerating the mighty peaks of both ranges, of which ten are still more or less volcanic, Colonel Church remarks that, as one rides through the river gorges, geological sections are exposed, hundreds of feet in thickness, of volcanic rock and ash alternating with thin caps of earth, showing what a perfect furnace of nature Ecuador must have been. The erupted ash has, however, fertilising qualities, and is soon covered with vegetation, resulting in a productive layer of humus. Very different from this comparatively unproductive and arid inter-Andean section, are those both to its east and west. The former, or Amazons section, is completely forest-covered; the dry winds which leave the African coast and become thoroughly saturated during their transit of the Atlantic, reach their acme of precipitation as they approach the numerous snowy peaks of Ecuador, and give birth to a dense and rank growth of vegetation on the eastern foot-hills of the Andes. On the west, also, which receives the rain-clouds of the Pacific, most of the lands are forest-covered, the trees becoming larger and taller the nearer the base of the ridge of the Andes is approached, until in the gorges of the western spurs the very hot-houses of nature are found, steaming under a tropical sun, and forcing into existence a prodigal vegetation, where each plant has to wage war for existence against its fellows. This Pacific section must have been at no very remote geological period an archipelago, the islands of which were the outposts of the Andes, presenting hills and slaty ridges rising from 50 to 3000 feet above the ocean, and having a certain parallelism with the Andean chain. The slow uplifting of the coast-line and the denudation of the cordillera have filled up the intervals between these former islands to such an elevation that the floods of the rainy season do not cover the low lands

except in the Guayaquil valley, where also the filling-up process threatens rapidly to destroy the utility of Guayaquil itself as a port.

A rapid review of the river system shows that at least 2500 miles are suitable for steamboat navigation on the Amazons side, and probably as much more for boats; whilst on the western side there are some 500 miles.

As to climate, the rainy season is usually from December to June, the remaining months being called dry; on the Amazons slope it rains all the year round. As regards the influence of climate on man, there are vast healthy districts in the river valleys of the Amazons region, whilst those of the Pacific shore are commonly full of disease. Any special disorders appear to be chiefly due there to the lack of sanitary measures, and in the west and north-western parts to the abuse of sweets as food, which results in a curious and frightful intestinal complaint.

The country is, and must apparently remain, almost wholly agricultural, the Pacific coast and river valleys of both east and west yielding generous crops of cacao, sugar-cane, cotton, rice, coffee, tobacco, and tropical fruits, whilst the inter-Andean plateau produces all the cereals and vegetables incident to a temperate and even cold climate (though of inferior quality), and in favoured localities sugar-cane and maize. No hope of its ever being an exporter of cereals is held out; and cattle do not thrive in the Amazons section—chiefly, it is believed, from the immense number of bats which bleed or otherwise irritate them. Chinchona bark, for which the world was first indebted to the province of Loja, is now being so rapidly cut and sent out of the country without any attempt at planting for the future, that the supply must soon cease; and Colonel Church does not hesitate to record the opinion that the highest official sanction is given to this destructive measure for private emolument. In mineral wealth, Ecuador is probably one of the poorest of the South American States, containing on the western slopes only a few (and not rich) alluvial deposits of gold, which are more abundant in the valleys of the Amazons section. The provinces of Azuay and Loja are the only ones giving indications of valuable mines warranting the investment of capital.

The population is estimated as 1,000,000 at the most, exclusive of savage tribes, divided as follows: White, 100,000; mixed, 300,000; pure Indian, 600,000. (Behm and Wagner give 946,033 from official returns in 1878.) The pure Indians are Quichua, more genial in expression than those of Bolivia and Peru, but with no apparent elements for the re-creation of a manly nation. Their language is not so pure as the Bolivian Quichua, being split into several dialects more or less mixed with Spanish. The evil qualities of the mixed races are briefly condemned as the source of the degradation of the country.

After lucidly discussing the internal administration of the Republic, Colonel Church points out the importance of the Putumayo and Caqueta

affluents of the Amazons as trade routes, and enters at some length upon the possibilities of creating internal communications, of which scarcely any now exist. Personally interested in the construction of future railroads, he is nevertheless of opinion that a thorough system of first-class mule routes would be the best for Ecuador for the next ten or twenty years.

The Report contains a short notice of the Galápagos Islands, which were annexed in 1832, and colonised through the energy of General Villamil, who was subsequently thwarted in every way by his Government. The islands are now practically abandoned, and have relapsed into their old condition, save for the increase of Villamil's cattle. The occupation by Ecuador is considered not to exist to a sufficient extent to entitle it to the respect of other nations.

In spite of the numerous and great natural advantages of the Republic, Colonel Church is compelled to admit that his report is not favourable; and he summarises his reasons in the sentence:—"Until the patriotic element unites to strengthen municipal power, finances, and privileges, Ecuador will have neither prosperity and republicanism at home, nor honour abroad."

Obituary.

James Young, of Kelly.—The death of this much-respected member of the Society is recorded as having occurred on the 13th of May at his residence, Kelly, on the Firth of Clyde, in the seventy-first year of his age. He was widely known for his discoveries in practical chemistry, particularly with regard to the extraction of a light-oil, or paraffin, from coal products, for illuminating purposes, and for the new industry he thereupon founded in the neighbourhood of Glasgow. In the annals of geography his name will always occupy an honoured place through its connection with that of Dr. Livingstone, whose schemes of exploration and philanthropy he supported with his steady sympathy and pecuniary aid. When, in 1871, after two and a half years had elapsed without direct tidings of Livingstone, then wandering in the remote interior, our Society decided on organising an expedition for his search and relief, and the funds collected were sufficient only for one such expedition from the eastern side of Africa, he made an offer through his friend the Rev. Horace Waller to our President, Sir Henry Rawlinson, to equip at his own sole cost, a similar expedition from the west coast, it being thought probable that Livingstone on finding that the Lualaba was not, as he had supposed, connected with the Nile, but trended towards the Congo, would try to find his way to the Atlantic along the course of that river. The expedition was intrusted to the command of Lieutenant Grandy, R.N., who after failing, as others have done since, to force his way by the land route from San Salvador, and hitting at last on the only practicable entry into the interior along the banks of the Congo, was recalled on news of Livingstone's death reaching England. The expenses of the expedition amounted to 3041*l*. But he was a generous benefactor also in his own special domain of chemistry. He endowed Anderson's College, where he received his first instruction in chemistry by attending as a youth the lectures of Professor Graham, with a chair of practical chemistry, and presented his native city of Glasgow with a bronze statue of his teacher, for whose memory he entertained a lasting regard.

CORRESPONDENCE.

An Excursion in the Interior of New Guinea.

Port Moresby, New Guinea, *February 7th*, 1883.

Dear Sir,—We have recently returned from an interesting journey into the interior and visit to the Rouna falls. This is not quite new ground, but the falls have been only visited by a few, and I do not think any account of them has been published. The journey was new in one respect: Mrs. Lawes made one of the party, and was thus the first white lady to tread the "unbeaten tracks" of New Guinea.

Our object was twofold: first, to see the Rouna falls, and secondly, to visit the district of Tabure and Sogere at the back of the Astrolabe Mountains. Our party consisted of Mrs. Lawes, Mr. Chalmers, and self, with about twenty natives as carriers, &c.

Our first day's journey was on horse to the village of Rabadomu, about 15 miles from here in an easterly direction. We slept there, and started on foot at daybreak next morning. The mountain we had to ascend was right before us, covered with a light mantle of cloud. But before we reached its base we had to ascend and descend many times—sometimes as high as 300 feet and then down again to sea-level. The sun was high by the time we reached a pretty little creek at the foot of the mountain proper. We rested here a while and then prepared for the ascent. Mrs. Lawes had as guide and companion a trusty Koitapu native, who was very proud of his office.

We had three aneroids with us, one of the R. G. S. and two smaller of Steward's. The mean of readings at base of mountain was 608. The first part of the ascent was by a narrow but shady path, and this brought us to within 700 feet of the top. The last piece was a sheer ascent up the perpendicular face of the mountain. From below it seemed impossible that any path could be made up it, but we found a narrow zigzag track which brought us by a step at a time to the top. Mrs. Lawes was among the first at the summit. The mean of our aneroids gave 2600 feet, so that the actual height would be 1992 feet. The boiling-point thermometer read 211·6° at the bottom, and 207·6° at the top, with temperature at 80°, which would make the height of mountain 2320 feet.

The native name of the mountain is Veriata. We had a grand view from the top. As far as the eye could see was a panorama of sea and coast, hill and valley, intersected by many winding rivers and streams. At our feet ran the Laloke, and at our right hand could be plainly heard the roar of Rouna, although hidden from our view.

Our track lay in an easterly direction for about four miles, when we reached one of the Tabure villages, where, until quite recently, we had a mission teacher. His house was in good preservation, and we made it our headquarters while inland.

On the following day we visited the falls. They are not far from the teacher's house. An hour brought us quite to them at a leisurely pace. Long before that the river opened up. This valley of the Laloke forms one of the finest views I have seen in New Guinea. On this, the eastern side, the ground slopes away to the river, covered with rugged boulders and stunted vegetation. On the western side the cliffs rise almost perpendicularly to a height of 300 feet in the highest part, the summit and every crack or crevice being covered with vegetation. At the feet of these the river winds over a rocky, uneven bed, strewn with huge boulders forming a series of cascades. Standing as we did on the way down, looking up the valley northward, we

could see the course of the river for two or three miles. It takes a sudden bend at the falls, so that you do not see the river above and below them from the same place.

You see nothing of the falls until you are just over them, and then to look down is enough to make any but a native dizzy. The stream is broken just above the fall by a huge boulder lying at an angle of about 45°, and about 60 feet in length on the upper face. Between this and the falls is a small rocky island covered with creeping palms and tropical vegetation. Just at the break were several bare rocks in mid-stream, on which some of our native boys stood with folded arms looking down into the abyss below.

The river was low, but in the rainy season all these rocks, now bare, are covered. The principal fall is on the eastern side, the greatest body of water falls over here, but about 100 feet lower down it breaks on a flat perpendicular rock. On the western side there was less water, but it is a sheer fall right to the bottom, where there is a terrible cauldron. We had no difficulty in getting right down to the stream, and standing in the shallow water at the side looking over the fall itself. There is a small friendly tree there which one can hold on to for safety. Here we read the aneroids and boiled a spirit-lamp for boiling-point. The former gave respectively 1150 and 1350, and the boiling-point thermometer 209·8°.

We inquired of the natives if there was any road to the bottom; they said it was possible but very difficult. But the offer of a tomahawk induced one to act as guide, and Mr. Chalmers went with him. They reached the bottom and made their way to the base of the falls. Here the aneroids registered 900 and 1100. This makes the height of fall exactly 250 feet by both aneroids. The boiling-point thermometer read 210·4°. The temperature was 80°; with the correction for this I make the difference between top and bottom 347 feet. We were very careful in marking the exact boiling-point. I suppose the river at the head of the falls to be about 50 yards wide, and below it is a series of small waterfalls, descending very rapidly. In the wet season there must be an enormous rush of water down this narrow bed. We saw from the debris at the top of some of the rocks how high it sometimes rises.

After a few days' rest at Tabure we went on to the district of Sogere, about 18 or 20 miles in an east by northerly direction. Our track was over a level country, and certainly well watered. We had to cross the Laloke an hour after starting. It is often unfordable here, but we were fortunate in finding it low. The current was very strong, and the bed of the river very uneven, but two or three joining hands, we got across without any mishap.

Soon after crossing the river we came to the solitary house of one of the Sogere chiefs. He installed himself as our guide and spokesman, and was very useful, although he had a great weakness for making speeches on every and no occasion. Our road lay through forest country, and for mile after mile we met no one and saw no house or garden. The trees were grand, especially some pandanus and banyans; beautiful mosses were on the damp ground, with a network of creepers and an occasional orchid overhead, while the wild strawberries and raspberries reminded us of our distant home.

Birds of paradise (*Paradisea raggiana*) were to be heard all the time, and now and then the clear note of the bell bird rung through the woods, so like a bell as to puzzle even familiar ears. The spell, however, of all this was often rudely broken by a muddy river or stream to cross. This was generally done by a New Guinea bridge, viz. a fallen tree. The round, smooth, slippery trunk was good enough bridge for the natives with their bare feet, but awkward enough for us in boots. It did not make one feel any steadier to know that crocodiles were plentiful in many of these streams. We were bitten, however, by nothing worse than leeches, and these caused

no end of amusement. The weeds and grass by the roadside in damp places swarmed with them, and they fastened on to any bare legs they could touch.

The district of Sogere, like all the other inland ones we know, consists of small scattered villages, rarely more than eight or ten houses in a village, and often only three or four. The village at which we camped consisted of seven houses, and three tree houses, which are really forts or castles. One was 120 feet high. One of the natives went up with an armful of spears and threw them down at an imaginary enemy. When they have reason to expect an enemy they take up a supply of big stones. These houses command the whole village, and from their height could not easily be taken.

On our return we found every small ditch swollen into a muddy river, and when we got to the Laloke it had risen so much as to be unfordable at the place we crossed in coming. We had to go some miles higher up, and here the swollen rushing waters looked anything but inviting, but after our oratorical friend had made a speech to the river, and rated it for its bad taste in treating visitors, and a white lady too, so badly, we managed to wade across all right.

During our stay at Tabure we made a second visit to the falls when the river was somewhat higher than on the first occasion.

We saw a good deal of the natives; they all look upon us as their friends. They are a good specimen of the average Koiarian. They are somewhat darker in colour and smaller in stature than the coast tribes. They are more hairy too. It is no uncommon thing to see a man with beard and moustache. They are remarkably honest. Mr. Goldie, a botanical and naturalist collector, had his camp for some months in this district, and although there were knives, hatchets, &c., continually lying about, nothing at all was stolen. Like all the other tribes, they are exceedingly superstitious, but their superstition takes a peculiar and most unfortunate form. When a man is ill and dies, he is supposed to be bewitched and not diseased. Almost all the tribes have this belief, but the Koiarians go farther than others. They always know whose spirit has bewitched their friend, and the tribe to whom the spirit belongs has to pay for it. The deceased would not be able to rest until one of that tribe is killed to pay for his death. Whenever a man of the least consequence dies there is always fighting. Tribes that have been on the most friendly terms become enemies on this account alone. We succeeded in preventing fighting during our visit in the case of a tribe who had lost a man through some bad spirit belonging to the Sogere tribe.

Their mode of getting fire is peculiar. They get a dry stick of pithy wood and split it a little way. In the cleft they put a piece of wood or a stone to keep it open, then putting a little rubbish as tinder under the split part of the stick, they stand on the other end and pass a strip of rattan cane or bamboo under the cleft, drawing it rapidly up and down, when it soon begins to smoke, and a spark appears between the fork of the stick, which with a little careful manipulation sets fire to the tinder and a flame is soon obtained. It seems to me easier and quicker than the common way of getting fire with two sticks.

Food is very plentiful in these mountain regions. The gardens, made on the sides of breakneck gullies, are very productive. They grow splendid sugar-cane, a great variety of bananas, and plenty of taro and yams. Breadfruit trees are plentiful, but the fruit is small and full of seeds—very poor after the South Sea Islands breadfruit.

The natives have a great craving for salt; no present is more acceptable than a screw of salt, they prefer it to sugar. They eat it alone, but are especially fond of chewing it with green ginger.

We returned home after spending ten days in the mountains. We had walked about 60 miles and ridden 30.

I am sorry that I could not fix the exact positions of the mountain and falls, but our *time* failed us; the pocket chronometer has stopped, and after I had rated my watch it also stopped. All I could do under the circumstances was to get cross bearings with the prismatic compass. I inclose them and also a tracing showing what we suppose to be about the position of the places we visited.

I am, yours sincerely,

The Secretary R. Geogr. Society. W. G. Lawes.

PROCEEDINGS OF FOREIGN SOCIETIES

Geographical Society of Paris.—April 20th, 1883, first General Meeting of the year: M. Ferdinand de Lesseps in the Chair.—The Meeting was chiefly occupied with the distribution of the prizes awarded by the Society. On the platform, besides the members of the Bureau, were the Mexican Minister at Paris, and a member of the United States Embassy, representing M. Morton, who was prevented from attending. Delegates were sent also by the Ministers of the Army, Navy, and Public Instruction respectively.—The Chairman opened the meeting with a speech, in which he recalled the fact that it was now fifty-four years since the Society made its first awards. Since that time 153 prizes had been awarded, of which 86 had been made to Frenchmen, and among these M. de Lesseps had the pleasure of being able to reckon himself. On the present occasion three of the awards were conferred upon Frenchmen, and for works having Africa as their object. Speaking of Africa M. de Lesseps stated that he had only just returned from that continent, and that he had visited it in order to consider on the spot the project of an inland sea in the Sahara. He was convinced that the scheme was practicable, as he had stated in the report which he had presented, since his return, to the Academy of Sciences, and that most happy results would follow from the creation of this inland sea.—M. William Hüber, General Secretary of the Commission of Prizes, then read his report, after which the medals were distributed as follows:—one to Commander Gallieni, for his mission to Sego-Sikoro (1880–1); another to Commander Derrien for his topographical mission to Senegal (1880–1); a third to M. Charles Hüber for his journey in Arabia (1879–82); the "Roquette" prize to M. F. Schwatka, the American lieutenant, for his voyage to King William's Land; and the "Erhard" prize to M. A. D. Langlois, for his maps of the department of Oran. Up to the present time it had been the practice of the Society, in making its awards, to recognise a mission in the person of its chief, at the same time giving due praise to his colleagues in the report; hence it has been the commander only who has received and kept the medal. In future the Society will give to each member of the mission a bronze medal, bearing a special inscription, which will be a reproduction of the gold medal awarded to the mission in the person of its commander. Speaking of M. Charnay's recent journey, and of his archæological discoveries in Yucatan, the Secretary stated that the Commission regretted its inability to recognise their value by a medal this year, the results of the journey not being as yet embodied in a printed work (which is a *sine quâ non* condition, according to the Society's rules). M. Charnay's journey had been largely supported by M. Pierre Lorillard (of New York), a descendant of a French family, which took refuge in Holland in consequence of the revocation of the Edict of Nantes, and then emigrated to America. From the report of M. Hüber it appeared that this generous patron of many scientific enterprises and charitable works is now instituting a prize of 1000*l.* (25,000 francs) to the man who will be the first to decipher the inscriptions engraved on the monuments which M. Charnay has brought from Yucatan.—The reports upon

the journeys which had merited prizes were then read by the various secretaries, MM. H. Duveyrier, H. de Bizemont (requested by M. Maunoir), Comte de la Turenne, Schrader, and Dunan.—On behalf of the Gallieni mission it was stated that its geographical work may be divided into four sections. (i.) The exploration of the district lying between Bafulabé and Kita. (ii.) The examination of the course of the Baula, from the ford of Tukoto on the Bakhoy to Sambabugu, and also of the country which extends from this latter point to Marena. (iii.) The survey of Birgo and of Manding, together with the exploration of the route from Kita to Niagassola and Nafadia. (iv.) The exploration of the country from Kita by the Bélédugu and Bammaku to Sego. The map prepared by the mission just completes that of Western Soudan, by Mage (1868). The last part of the geographical work of M. Gallieni and his colleagues consisted in preparing accurately a map of the district which lies along the right bank of the Niger, between the ford of Turella and Nango, a region which Mage's account has already made sufficiently well known.—The object of the Derrien mission was to execute a reconnaissance of the Upper Senegal and the Upper Niger, and to find a simple and economical route for a railway between the two rivers. From the observations which the mission has made, it appears that there is no serious obstacle to the execution of this great enterprise. From Kayes to Bafulabé the survey of the land has already been made; from this latter point to Kita, instead of skirting the Bakhoy, whose banks are very uneven, it is proposed to follow the route traversed by the mission on its return, and along which, for a distance of 135 miles (217 kilometres), only one hill is encountered. Moreover, the ground there is protected from inundations, and the inhabitants are peaceable. Between Kita and Bammaku M. Derrien, in accordance with information obtained from the natives, recommends the route which follows the valley of the Bakhoy, then that of the Kumakhana river, in order to descend to the Niger by the hill of Sanamorila and the valley of the Amarakoba. By this route the railway will command the great market of Keniera, near the gold-mines of Buré; it will pass through the friendly peoples of Manding, and it will follow the caravan route. A map showing the journeys of MM. Derrien and Gallieni in the kingdom of Sego had been passed round at the commencement of the meeting.—Another map, which was also supplied to the audience, showed the travels of M. Charles Hüber in Northern Arabia and in the Syrian desert (1879–82). The route followed by the traveller is not altogether new. M. Wallin (1848), Mr. Palgrave (1862), M. Guarman (1864), M. Doughty (1876–8), M. and Mme. Blunt (1878–9), had already made journeys more or less long in the country, and trodden almost all the ground which M. Hüber must have traversed. But geography occupied but a secondary place in their thoughts, and it would have been useless, says M. Duveyrier, for any one to try and disentangle from their accounts either the great fundamental features of the physical geography of the North of Arabia, or to obtain any data, however scanty, from which to prepare a map of it. M. Hüber's journey just supplies these deficiencies. It throws an altogether new light upon our knowledge of the geography of Northern Arabia, of its past civilisation, and of the present habits of the representatives of the Wahabite power.—After the reading of all the reports and the distribution of the medals, M. Bouquet de la Grye (Hydrographical Engineer and Vice-President of the Central Commission) gave an account of his recent voyage to Mexico, where he went to make observations upon the transit of Venus, a phenomenon which will not be seen again either during this century or the next; four generations will have to pass away before it occurs again. It was at Puebla that the French mission studied the phenomenon. M. B. de la Grye described this town, the installation of the French observations at Fort Loreta, and the astronomical observations made on the 6th of December, 1882, which were a complete success. At other stations the

astronomers were not so fortunate.—In conclusion, the results of the ballot for the election of the Bureau of the Society (1883–4) were announced: President, M. de Lesseps, re-elected; Vice-Presidents, M. Maltebrun and M. H. Duveyrier; Secretary, M. D. Charnay. (The scrutineers were M. L. Vignes and M. P. Mirabaud.)

——— May 4th, 1883: M. Antoine d'Abbadie (of the Institute) in the Chair. —M. de Bernardières, naval lieutenant, who has been to Chili on a scientific mission (the observation of the transit of Venus) had written from Buenos Ayres, on his arrival there, to the effect that two of the men who formed part of the Crevaux mission, viz. the boatswain, a Frenchman named Haurat, and an Argentine sailor of the name of Blanco, are still alive and prisoners among the Indians. This news has been forthwith communicated to the French press. M. de Bernardières further states in his letter that he has been commissioned by Dr. Estan. Zeballos, President of the Argentine Geographical Institute, to send to the Society the originals of some astronomical observations taken by Crevaux, particularly affecting the geographical positions of Salta and Jujuy, the capitals of two provinces of the same names in the Argentine Republic. These positions had not previously been scientifically determined. In a letter dated March 21st, Dr. Zeballos states that a fresh expedition of a military character, and organised by the Argentine Government, had just started for the Pilcomayo. It is commanded by Colonel Sola, commander-in-chief on the frontiers of the Grand Chaco, and is composed of 200 men from the regular army. Its object is to surround the Indians in their forest retreats and to obtain the release of Haurat and Blanco. On the way Colonel Sola will endeavour to solve the geographical problem concerning the existence of a new river in the Chaco, the Teyo, a river running parallel with the Pilcomayo. — M. Alph. Milne-Edwards (of the Institute), Professor of the Natural History Museum, who is going to undertake a fresh campaign in the interests of submarine zoology, no longer in the *Travailleur* but in a vessel named *Le Talisman*, announced the 1st of June as the date of his departure. He will sail along the western coast of Africa as far as the Cape Verd Islands, then he will explore the Sargassus Sea, and will finish with a stay at the Azores Islands.—Dr. Colin, naval physician, writes on board *La Gironde* that he has embarked on the mission, with which he is charged, to Buré, to Uassulu and to the other auriferous countries which surround the Upper Niger. He will there collect as much scientific and geographical information as possible. In two months he will be on the Niger, and will take advantage of the rainy season to make excursions into the neighbouring countries. He will return next April twelvemonth.—A letter dated from Uitscha, March 3rd, was received from M. Robert Flegel, the envoy of the German African Society, who for several years has been travelling in the district of the Lower Niger, stating that he had just discovered the sources of the Benué and of the Logona, a tributary of the Shary; he promises to give more complete details later on.—M. Gabriel Marcel, of the Map and Plan Department (National Library), sent a work which he has just published in the 'Scientific Review'; the title of this historico-geographical work is 'Nos droits sur Madagascar.' The book is curious inasmuch as it reproduces a manuscript map which has escaped the notice of M. Grandidier, in spite of the care which the latter has exercised in collecting all the documents relating to this great island. The map shows all that portion of the island subjected to French arms and influence by Flacourt, Mondevergue, &c.— M. P. Schjelderup Nissen, lieutenant of the Norwegian Staff, transmitted a map of Norway in four sheets, scale 1 : 800,000, prepared by the aid of journeys and information obtained from local authorities, the districts represented not having been as yet the object of topographical surveys. The same correspondent sends also the second

edition of a map of South Norway on the same scale in two sheets.—General Mich. Venukoff sent to the Bureau a copy of a work of his on the physico-geographical conditions of the existence and development of the Russian people (published in a Russian review), and at the same time a very interesting account of the Exhibition recently opened at the Winter Palace in St. Petersburg. The Exhibition contains the works in connection with astronomy, geodesy, topography, and geography undertaken and executed in Russia during the year 1882, and not only in Russia but also by Russians in Turkey, Persia, Independent Turkistan, Dzungaria, Mongolia, and Manchuria. M. Venukoff enumerates the documents which appear to him to offer the most interest in this collection. His communication will be inserted *in extenso* in the report of the meetings.—The same will be done in the case of a letter, sent by M. Romanet du Caillaud upon the administrative divisions of Tong-king, and on the difficulty of accurately computing its population. The author has drawn his information especially from 'Le Correo Sino-annamita,' a work compiled with the aid of letters of Spanish Dominican missionaries. Upon this authority the population of Tong-king would be more than 18 millions (Central Tong-king, 4 millions; East Tong-king, 5 millions; West Tong-king, 7,800,000; South Tong-king, 2 millions). The same correspondent sends some information on that part of the West Coast of Africa, against the occupation of which the Portuguese, i. e. the newspapers, have recently protested, viz. Ponta-Negra, of which M. de Brazza and his company are announced as having taken possession. This locality is 68 miles (110 kilometres) distant from Malemba, the extreme point of the "theoretical" possessions of the Portuguese. The writer refers to the map of the coast of Loango and of the Congo, published by Père Duparquet in 1875, in which are indicated with their nationalities the different European factories of the coast. Lastly a third communication from M. Romanet du Caillaud consists of an account of the relations of the Portuguese and the French, which, he says, ought to be more intimate. Indo-China being full of the fame of the glories of Portugal, our correspondent asks the Society to fall in with a wish that he has formed, viz. that France should give the names of Portuguese travellers either to various points of Annam still unnamed, or to the streets of Saigon, or to French concessions at Hanoi, at Haiphong, &c. This desire will be transmitted to the Central Commission.—A note was received from M. Severtsof on the ancient routes across Pamir, together with a manuscript map.*—The French chargé d'affaires at Stockholm and the French Minister at Copenhagen sent some information on the fresh voyage which M. Nordenskiöld is undertaking to Greenland. At the same time a Danish expedition is to visit the eastern coast and prepare a map of it. It will also study the extent and movements of the great masses of ice in these latitudes. This latter expedition will remain several years in the country.—It was announced that a society has been organised for a trip to Norway and Spitzbergen in 1883, the cost of tickets being 100*l.* sterling. The company transmitted an Anglo-French prospectus announcing that the departure will take place from Havre at the beginning of June. "Proceeding thence direct to Christiania . . . then along the west coast of Norway, stopping especially at Cape North and Hammerfest. From Hammerfest the steamer will proceed as far as Spitzbergen, passing by Bear Island."—The General Secretary then stated that the Royal Geographical Society of London had just awarded the Back Prize for 1883 to M. l'Abbé Petitot, the missionary who has lived for so many years in the midst of the ice of Canada.—M. Letaille, who has returned from Tunis, presented to the Society some photographs, a map, with three itineraries, as well as the inscriptions which he has discovered, and regarding which he will shortly speak before the Society.—M. Emile Guiard, brother of one of the

* See the quarterly *Bulletin* of the Society.

victims of the Flatters mission, stated that in his opinion the inauguration of a monument recently erected at Uargla to the memory of the unfortunate travellers was not sufficiently imposing, and he went on to compare to this, an almost private ceremony, the respect paid by the English to the remains of Gill and Palmer, which were interred in Westminster Abbey, their murderers being apprehended scarcely two months after the crime. He demanded the punishment of the murderers of the Flatters mission, who are known at Insalah.—In conclusion, M. Mosenthal, Consul o the Orange River Republic at Paris, read a paper on the Island of Cuba.*

Geographical Society of Stockholm.—February 16th, 1883: the President, Dr. O. Montelius, in the Chair.—The Meeting accepted Baron Nordenskiöld's proposition to confer the *Vega* medal on Mr. Stanley. This distinction, which the Society may confer on men who are distinguished for their geographical researches, and which has been instituted in honour of the *Vega* expedition, has only been twice before awarded, viz. in 1881 to Baron Nordenskiöld, and in 1882 to Captain Palander.—Dr. H. Stolpe read a paper on the ethnography of the Pacific islands. He selected on this occasion Easter Island, referring to its position, discovery, and the former visits of Cook, La Peyrouse, and Kotzebue, and the more recent journeys, in 1868, of Palmer, and in 1877 of Pinart. The most remarkable recent discovery in the island was a number of rough stone figures, representing human heads and busts without arms or legs. Two were found in the bottom of a volcanic crater and some on the coast. Some bore inscriptions, which had, however, not yet been interpreted. The natives referred them to pre-historic inhabitants. Other remains such as sepulture vaults and carved wooden boards, bespoke a high pre-historic culture. The speaker urged a close examination of these relics.—Dr. H. Hjärne next gave an account of the Russians as a colonising people. Having traced the outlines of the Russian conquests in the East, he pointed out the remarkable fact, that the Sclave, when assimilating with the races of Siberia, gradually becomes Siberian both in religion and habits. The most remarkable statement by the speaker was, however, that since the emancipation the Russian peasants have shown a distinct tendency to wander eastwards, which the Government do everything to counteract.

——— March 16th, 1883: the President, Dr. O. Montelius, in the Chair.—The first who addressed the Meeting was Baron v. Düben, who stated that, in consequence of M. Rogozinsky's journey to Africa not having taken place, one of the members of the expedition, the Swedish traveller, Captain T. C. Een, had joined Mr. Stanley on the Congo. He would, whilst in Africa, make collections for the National Museum.—Herr R. Arpi next gave an account of Iceland, chiefly ethnographical, as studied during his journeys there in 1881 and 1882.—Captain A. Fries exhibited and described the utensils used in South and Central America for drinking "maté," while lastly Consul Elfving gave an account of Mr. O'Donovan's journey to Merv.—At this meeting a model of a group of fishing Chukches was exhibited which are intended for the International Fisheries Exhibition in London. It consists of a man and a woman, the former standing, with an ice "bill" in his hand, and the latter sitting, with a rod in her hand. Both dresses and weapons were brought home in the *Vega*, with other articles. The faces of the figures were sculptured by Herr Hyllengren, and painted by Miss Westfelt, and the whole arranged by Miss Palman from a drawing in Nordenskiöld's 'Voyage of the *Vega*.'

——— April 24th, 1883: the President, Dr. O. Montelius, in the Chair.—King Oscar, the Crown Prince, and the Duke of Vestergötland were present at the

* See the quarterly *Bulletin* of the Society.

meeting, which was held on the anniversary of the return of the *Vega*. The meeting opened by the Chairman handing the *Vega* medal, conferred on Mr. Stanley, to the United States Minister in Stockholm, Mr. Stevens, who thanked him for the honour conferred upon his countryman.—Baron Nordenskiöld next gave an account of his intended expedition to Greenland. The speaker said that soon after the return of the *Vega* a rumour went forth, that a new Arctic expedition was about to be equipped, and that the object of the journey was this time the New Siberian Islands. At that time it was really his intention to have visited these islands where so many interesting problems still remain to be solved, taking his expedition by way of the river Lena. In the meantime circumstances, however, caused him to abandon this plan, as several of the explorations he had in view had been effected by the unfortunate *Jeannette* expedition, while, by the search-expeditions despatched to relieve De Long, the delta of the Lena had also been explored in every direction, and eventually it was decided to establish a Russian observatory at the mouth of this river as part of the international programme of observation. It therefore appeared to him that the time for an expedition to the New Siberian Islands was not suitable, and he turned his attention instead to another polar land, where just as important problems remained to be solved, viz. Greenland. Greenland was discovered nine hundred years ago, viz. in 983, by the Norwegian Erik Röde, and its discovery caused at the time great excitement in North Europe. Several colonies were founded there, which flourished so well, that they numbered about 300 farms or "Gaarde," of which 200 were in the so-called "Osterbygd," and 100 in the "Vesterbygd." By degrees the voyages of the Norwegians to Greenland ceased, probably owing to the circumstance that the trade there became a Government monopoly, and to the "black pest," which devastated Norway. At last the colonies were forgotten in the mother-country, and it was only through Columbus' discovery that attention was recalled to them. The attempts which were made to reach Greenland, were, however, long unsuccessful. The south-east coast, where the Osterbygd was believed to have stood, being nearest Iceland, was found to be so closely girt by drift-ice that no vessel could reach it, and this has in fact been the case ever since, although, of course, vessels have reached the coast further to the north. During the attempts which were made in the sixteenth century to find the north-west passage, it was however discovered that the west coast was easily reached; but colonies were not founded here until the eighteenth century, when the Norwegian, Hans Egede, with the object of finding and converting his old countrymen, settled among the Esquimaux on the west coast. At present there are a number of Danish colonies on this coast from Cape Farewell to Upernivik, lat. 73°. Through the researches of Danish and Swedish *savans* the west coast of Greenland had become one of the best known countries in the Arctic regions. This was, however, far from being the case with the east coast and the whole of the interior. It has been assumed by travellers that the extensive glaciers which are encountered along the coast, and which form an ice plateau 3000 to 6000 feet high, from which ice is precipitated through certain fiords into the sea, cover the entire country. The example of Greenland has been advanced as a proof that a part of the globe was during the last geological age covered with ice. But during his journey along the coast of Siberia, where the climate is far more severe than in Greenland, and also from subsequent researches, he had come to the conclusion that provided there do not exist causes in the interior for the formation of ice, of which we are not aware, it was a physical impossibility that Greenland could be entirely covered with ice. His reasons for this assumption were that all winds which reach Greenland must have passed the sea and thus be moist. Now, when such a wind passes a mountain ridge, it assumes the properties of the Fohn wind, i.e. after having passed the mountains it is dry and

warm. If the orographical condition of Greenland now was such that the country rose gradually from the coast on all sides this theory would be untenable, but as it is improbable that this country is entirely different from all others on the globe, and that valleys and plains must exist here in the interior, it is evident that all winds reaching the interior must have the properties of the Fohn wind, i.e. are dry and somewhat warm. The conditions for a "permanent" ice formation he believed could therefore not exist in Greenland, and the interior was most probably free from ice. The solution of this problem was the chief object of the expedition, while it would no doubt also be fruitful as regards geography and geology. More than one chapter in the chief works on geology would have to be re-written if it should be proved that his assumption was true. There were besides many other important scientific problems to be solved by this expedition. Of these there was the sea between Reikiavik and Cape Farewell, which is very little known, as well as the sea west of Greenland, known less still. Dredgings and hydrographical soundings of these seas would therefore, no doubt, give great scientific results. Another object was the fine dust which he had on many occasions examined, and which is found in small quantities on the snow and ice in polar regions, a phenomenon of great scientific interest, as the dust had been found to contain metallic iron, nickel, and cobalt, and was thus shown to be of cosmic origin. It was to be hoped that the expedition would, during its progress along the ice between Reikiavik and Cape Farewell, be in a position to search for such dust. The polar countries, whose climate is now so inhospitable, had, during the geological period nearest to our own, viz. the tertiary, quite different conditions of temperature. As an example of this he might mention that of the trees which form the principal vegetation of Texas, viz. *Taxodium distichum*, fossil remains were found in large quantities in Spitzbergen. In Greenland too there were numerous signs of a previous rich vegetation, which had been fully demonstrated by early investigators, as well as by himself in 1870. As one of the most celebrated students of fossil palæontology, Dr. A. G. Nathorst, would accompany him on his expedition, he felt sure that even here important discoveries would be the result. In 1870 he had discovered the well-known iron blocks on Disco Island, which had caused such an active scientific controversy, as to whether they were of terrestrial or meteoric origin, which latter theory he defended himself. This discovery is however, not the only one of its kind in Greenland; Ross and Sabine had found some similar blocks at Cape York, lat. 76°, where they were used by the Esquimaux to make their utensils and weapons from. This subject it was also his intention to investigate; while he was away on the inland ice, the vessel with the other members of the expedition would steam to Cape York, and attempt to solve the problem, and during the journey there would also be a good opportunity of studying the botanical and palæontological features of these almost unknown parts, and make collections. No Scandinavian expedition to Greenland should lose sight of the problem: Where were the old Norse colonies situated? This had never been decided. From the circumstance that it had never been possible to penetrate the ice-barrier on the east coast, a Danish savant had come to the conclusion that the Osterbygd had never been situated here, but had been founded on the south-west coast where the Vesterbygd lay, a little further north. Against this assertion he could advance several objections. Firstly, he considered it strange, that the old Norsemen who sailed far and wide, should in Greenland have made such a great mistake as to the points of the compass, and secondly, he thought that the very insignificant remains found on the west coast could not be those of the magnificent buildings to which reference was made in the Sagas, even if the descriptions there were a little exaggerated. He considered, therefore, that there was much in favour of his belief that these colonies had lain on the east coast, and to decide this was also

one of the objects he had in view in the coming expedition. The following was the programme he had drawn up. The vessel would leave Gothenburg on May 20th, while he himself would join her some days later at Thurso, where she would call for coals. From here she would go to Reikiavik, perhaps calling at Rödefjord on the south coast of Iceland to land a Swedish naturalist, and to collect some of the splendid minerals which are to be found here. In Reikiavik, the stay would only be for a few days for coaling. From here she would make for the ice-belt in the west, without, however, attempting to penetrate the same, which all experience had shown to be futile. After having passed Cape Farewell, dredging the sea, the vessel would go to Ivigtuk on the west coast of Greenland, which is a spot of mineralogical interest, as here are found large masses of the rare mineral "kryolit" as well as other kinds. The next place visited would be the Auleitsivik fiord, from which he and Professor S. Berggren had in 1870 made the excursion on the inland ice. He intended to make this spot his starting-point also on this occasion, and his journey would, he estimated, last thirty to forty days, the land party consisting of ten in all. While he was absent, the party on board would make hydrographical researches in Davis Strait, and examine the iron blocks at Cape York already referred to. When the trip to the inland ice was ended, the vessel would steam to Ivigtuk to coal, and the expedition to the east coast be effected. In September he expected to find an ice-free channel along this coast. On his return voyage his course would be outside the ice. The expedition was patronised by the King, and the Government had placed the steamer *Sophia* at its disposal, which vessel on account of her construction, with water-tight compartments, a powerful engine, and being of handy size, would be very suitable, as there was no intention of forcing the ice. The expenses of the expedition would be borne by Dr. Oscar Dickson, and the members of the same would be: Dr. Nathorst, palæontologist; Dr. Berlin, physician; Messrs. Forstrand and Kolthoff, zoologists; and Dr. Hamberg, hydrographer. The vessel would be commanded by Captain Emil Nilsson, who was an experienced Arctic skipper, while a Norwegian hunter, Herr Johannesen, and a Norwegian harpooner would accompany her as ice-masters. The total number of men would be twenty-four. The expedition was intended to return to Sweden in October next, and he, the commander, was certain that the journey was not in the least attended with danger, and that there was no fear of being frozen in, and thus compelled to winter. The number of nautical miles covered by the vessel would be:—Gothenburg to Thurso 500, Thurso to Reikiavik 700, Reikiavik to Ivigtuk 870, Ivigtuk to Auleitsivik fiord 540, Auleitsivik fiord to Omenak 330, Omenak to Cape York 400, viz. a total of 3340 nautical miles.

Société Khédiviale de Géographie, Cairo.—March 23rd: Nahdi Pasha, Governor of the Harrar, gave some particulars of that region from personal knowledge. As he could only address the Meeting in Arabic, his remarks were translated into French, and the following notes placed on the records of the Society:—There are two roads from Zeila to Harrar, the summer one through Tokoscia, Ambos, and Abasuen; the winter one, to the eastward, through Warabat, Mandaa, and Ensa. They unite at a point less than midway, and form but one road through Biakabonba, Kotto, Garasli, and the Gildessa Pass. This information corresponds with that contained in Giulietti's map of 1879, published by Guido Cora in his 'Kosmos,' with the exception that the latter shows "Ellan" in both the winter and summer road, whereas the Pasha's notes, as translated, make it at the point of junction. From Zaila to Gildessa the distance is ten days for camels doing seven hours a day; and twelve days for those marching six hours. From Zeila to Ellan is ten days; from Gildessa to Harrar, two days. The professional camel-men are "Issas," but at Gildessa, where the territory of the Gallas begins, they leave the traveller, who has to hire horses and camels from the latter people. There are no military stations

along the road, those of Ensa, Summedo, and Abasuen having been abolished. But the sheikhs of the several camping-grounds are responsible for the safety of travellers. No mishap ever occurs; merchants and others traverse the country with one or two camels, unattended save by two or three servants, and large sums of money are conveyed from Harrar to Zeila, and *vice versâ*, by simple messengers. It is, of course, to be understood that wages and hire are duly paid for service rendered. There is a road, besides, leading from Harrar to Berbera. This very difficult and very mountainous track passes through a country inhabited by the Somali Habaroni, who do not bear a good reputation. The journey is of sixteen days, of which four are without water; it is performed on donkeys and mules only. The country between Zeila and Harrar is generally sterile, little frequented, and little known. It is inhabited by nomad tribes. At Harrar itself and in the immediate neighbourhood, it is very fertile, cultivated, and well known. Each tribe of Gallas has its territorial limits clearly defined. The inhabitants are skilful workmen and industrious; they cultivate coffee and other plants, and work tolerably in iron and brass. Nominally Mussulmans, they are not, except in the towns, attentive to their religious duties. As to morals they are rather highway robbers than petty thieves. The priests and sheikhs of Harrar speak Arabic. Commerce is carried on by money payments and exchanges in kind, such as Venetian glass, Paris jewelry, and bits of brass or copper. There are several Europeans in Harrar, some twenty Greek merchants, four French Jesuits, one French and one Italian mercantile house. Nahdi Pasha concluded his remarks by inviting European travellers to Harrar and the country of the Gallas, pointing out that they were preferable to the dangerous and unhealthy regions of the Soudan and Central Africa. Security was to be found there, together with much matter of interesting research. He would be delighted to prove personally useful to new comers as he had been to former visitors and merchants; and he hoped to entertain there, at some time, members of the Khedivial Geographical Society. Two Arabic maps were exhibited and referred to by the speaker who, although he scarcely added any new information to that contained in the intelligent and exhaustive notes of Colonel Muhammad Mukhtar Bey, taken in 1876, deserves credit for so readily supplying the Cairo scientific public with the results of his experience in the Harrar and adjoining tracts.

——— April 20th: Dr. Abbate Pasha in the Chair.—A paper was read by Mr. Whitehouse, giving an account of recent explorations in the Faiyúm, chiefly with a view to determine the true position of the Lake Mœris. His argument against its identification with the "Birkatu-l-Karún" had already been intelligibly put about a year ago, and is to be found in the 'Proceedings of the Society of Biblical Archæology,' dated 6th June, 1882. On the present occasion Mr. Whitehouse went into his subject in considerable detail, and readily answered the interrogatories put to him by one or other of his auditors.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Bædeker, Kar —Griechenland. Handbuch für Reisende. Leipzig (Karl Bædeker): 1883, 12mo., pp. cxxii. and 371, maps, plans, panorama of Athens, and other illustrations. (*Dulau*: price 7*s.* 6*d.*)

This first issue on Greece by the well-known Leipzig publisher is based on 10 years' actual travel and observation by Dr. Lolling of Athens, with additions on Olympia by Dr. Dörpfeld and Dr. Karl Purgold, and on various archæolo-

logical points connected with the museums in Sparta, Piali (Tegea), and Dimitzana, &c., also by the latter authority. Contributions from other sources are also acknowledged, and Dr. Reinhard Kekulé has given an historical treatise on Greek Art, which with the other ethnological and chronological matter in the voluminous introduction removes the work above the usual guide-book type. The maps are of the whole kingdom (loose in cover), from Kiepert's new Hand-Atlas, scale 1 : 1,000,000, showing steamer lines (also reduced for easy reference on the cover at end); a general sketch of routes in South-eastern Europe, Asia Minor, and North Africa, scale 1 : 6,000,000; Corfu, scale 1 : 300,000; Athens and its vicinity, scale 1 : 150,000; the Piræus, scale 1 : 25,000; Mycenæ, scale 1 : 9400; the plans are of Athens, the Acropolis, and Olympia.

——— West- und Mittel-Russland. Handbuch für Reisende. Leipzig (Karl Bædeker): 1883, 12mo., pp. lii. and 442, maps and plans. (*Dulau*, price 10s.)

Also a new country for the series. In this case, the original groundwork is by Herr Pauli, a captain in the Prussian Artillery, long resident in Russia. A Geographical and Historical section is given in the Introduction, with a short list of books on the country. The maps are of the Warsaw Government, scale 1 : 2,000,000; the vicinity of St. Petersburg, scale 1 : 380,000; the Volga from Nishni-Novgorod to above Samara, scale 1 : 1,000,000; and Central Russia, scale 1 : 8,000,000. The plans are of Warsaw, its inner city and suburbs; Riga; St. Petersburg, inner city and the Eremitage; Helsingfors; Moscow, with the Kremlin; and Nishni-Novgorod.

——— Italy. Handbook for Travellers, by K. Baedeker. Third Part: Southern Italy and Sicily, with Excursions to the Lipari Islands, Malta, Sardinia, Tunis, and Corfu. Eighth revised edition. Leipsic (Karl Baedeker) and London (Dulau): 1883, 12mo., pp. xlviii. and 404, 24 maps, 16 plans. Price 6s.

Revised and augmented, especially as regards Naples, on the climatic and sanitary conditions of which some new and trustworthy notes are given. Some new maps and plans are also given.

Hare, Augustus J. C.—Cities of Southern Italy and Sicily. London (Smith, Elder, & Co.): 1883, post 8vo., pp. viii. and 535, woodcuts. Price 12s.

This very readable volume happens to come fitly next to the Bædeker last above mentioned. With practical information intended for the use of travellers and tourists, it includes much historical, architectural, and artistic detail of the many objects of interest covered by its title, and some few topographical notes.

ASIA.

Gilmour, [Rev.] James.—Among the Mongols. London (The Religious Tract Society): n.d., cr. 8vo., pp. xv. and 382, map and illustrations. Price 6s.

The author narrates his personal experiences among the Mongol tribes who inhabit the eastern portion of the plateau of Central Asia lying between Siberia and China. Starting from Peking, he first saw the great plain in August 1870, and during most of the intervening years has spent the summer months among the tribes to the west, north, and east of Kalgan, having had the opportunity during the winter months in Peking of meeting Mongols coming to that centre on government duty from nearly all the tribes scattered over the vast extent of desert territory which acknowledges Chinese rule. Knowledge of the language, familiarity with the people, and the author's carefulness of observation and caution of statement, warrant the belief that the information in this book is correct.

It is expressly noted that the Buddhism discussed in it is not the ancient theoretic system, but the modern development, for which the better name would be Lamaism. Some of the engravings are from sketches by a Chinese artist of Kalgan.

Murray-Aynsley, [Mrs.] J. C.—Our Tour in Southern India. London (F. V. White & Co.): 1883, 8vo., pp. 358 [no index]. Price 10*s.* 6*d.*

Leaving England at the end of October 1879, the authoress visits (besides various well-known localities) the Coorg territory, Cochin, Travancore, &c., and intersperses her narrative with much historical and architectural matter.

Walker, [Lieutenant-General] J. T.—General Report on the Operations of the Survey of India, comprising the Great Trigonometrical, the Topographical, and the Revenue Surveys under the Government of India, during 1881–82. Prepared under the superintendence of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., Surveyor-General of India. Calcutta (Bengal Secretariat Press): 1883, fo., pp. 1–79 and (1)–(120). Maps and frontispiece.

First of the chief operations carried out during the survey year from 1st October, 1881, to 30th September, 1882, recorded in this Report, is the Triangulation,—especially noteworthy from the fact that the chain of principal triangles known as the Eastern Frontier Series, which in previous years had been carried from Assam through Arakan and British Burma into Tenasserim, has now been brought to a close on a base line of verification at Mergui, thus finishing the principal triangulation of all India on the lines originally marked out by Colonel Everest, and sanctioned by the East India Company.

The completion of this great undertaking has necessitated a brief review of the whole operations, from the commencement in 1800 of the so-called "mathematical and geographical survey" in Southern India by Major Lambton on the recommendation of the Duke of Wellington (then Col. Wellesley), clearly illustrated by two charts, one a skeleton of the principal chains as completed to May 1882, with the proposed secondary triangulations in Upper Burma and down the Malayan Peninsula (192 miles to the inch); the other an index chart to the survey (96 miles to the inch), completed to 1st October, 1882, showing Lambton's network in Southern India, the meridional and longitudinal chains of principal triangles, base lines, spirit-levelling lines, astronomical stations, longitudinal arcs, and secondary triangulations for fixing peaks and the positions of Bangkok and Kandahar.

The Topographical operations have been carried on in continuation of those of the former year in Gwalior and Central India, Khandesh and the Bombay Native States, Bhopal and Malwa, Sylhet, and the Khasi and Garo Hills, Rajputana, Mysore, Kohat, Guzerat, Cutch, Meerut, South Deccan, the Hooghly river region, and Beluchistan,—the general out-turn being 6431 square miles surveyed on the ½-inch, 9081 on the 1-inch, 8627 on the 2-inch, 14 on the 6-inch, and 33 on the 16-inch scales, besides the Forest Survey and the survey of 46 square miles of towns, &c, on scales varying from 6 to 80 inches. The survey of the banks of the Hooghly is being carried on simultaneously with a survey of its bed now in progress under the orders of the Port Commissioners, and is of great importance, as the existing maps are out of date and on much too small a scale for practical utility in this densely populated and valuable riverain tract. In connection with this subject, it is pointed out that the old topographical surveys on which the sheets of the atlas of India on the scale of ¼-inch to the mile were founded, were in reality mere geographical reconnaissances, sufficient for their purpose, but now to be superseded by more elaborate survey operations.

The Mouzawar or Village survey of the Dera Ismail Khan district has been completed and extended into the Thal portion of Muzaffagarh, with an area of 1687 square miles; the Riverain surveys on the Jumna and Ganges have yielded 199 square miles; and the Forest surveys in Rawalpindi, Konkan, Tharawaddy (British Burma), and Khandesh cover 1311 square miles; all on the 4-inch scale. Considerable progress is also recorded in the cadastral surveys, areas of 1385 square miles in the North-West Provinces (Ghazipur, Ballia, Mirzapur, and Tarai districts), 3513 in British Burma (Hanthawaddy, Bassein, Tharawaddy, and Rangoon town districts), and 26 in Assam (Sylhet) being surveyed; whilst the geographical surveys and reconnaissances have resulted in the following additions to the country already mapped:—Burma and Manipur

boundary, 1600 miles on the ½-inch, and 1150 on the ¼-inch; Kohat frontier, 450 on the ½-inch; Beluchistan, 3240 on the ½-inch and 2420 on the ¼-inch; East Sikkim, 180 on the ½-inch; Nepal, 720 on the ½-inch; Tibet, 690 on the ½-inch; Dardistan, 200 on the ¼-inch; and Kishanganga, 600 miles on the ¼-inch.

As frequently the case in these Reports, the chief geographical interest attaches to the Trans-Himalayan explorations by native travellers, the conspicuous value of whose services is attested by the honourable official mention of the late Pundit Nain Singh, C.I.E., who received the Patron's gold medal of this Society in 1877 for his great journeys and surveys in Tibet and along the Upper Brahmaputra, and whose death occurred during the year recorded; and also by the publication of the award of the two medals placed at the disposal of the Surveyor-General by the International Geographical Congress at Venice in 1881. One of these has been presented to M—— S——, and the other is reserved for presentation to A——k, two of the native explorers whose work will be noticed hereunder. Before referring to these, however, it should be remarked that the extracts from the narrative reports of the executive officers in charge of the survey parties and operations given in the Appendix (such as those of Major Rogers, Major Strahan, Major Carter, Colonel Woodthorpe, Mr. McGill, Major Thuillier, Major Holdich, Colonel Haig, Mr. Jarbo, Mr. Badgley, and Mr. Hennessey), contain a very large amount of geographical information and topographical detail, with some points of ethnological and zoological interest. The somewhat lengthy notes of Mr. Jarbo and Major Badgley are especially to be signalised, as descriptive of little known parts of British Burma.

The recorded work of native explorers is as follows:—

(1) Explorations in and around Badakshán by M—— S——, a Pír or holy man, who in 1877 volunteered his services for geographical purposes, being about to make a journey from Kashmir across the Hindu Kush and Oxus to Koláb, to visit ancestral shrines. After being trained at Dehra Dún by the veteran Nain Singh, he arrived at Yasín, north-west of Gilghit, on December 14, 1878, and was detained there for nine months. In September 1879, he proceeded up the Darkoth valley (where Mr. Hayward was murdered), crossed the Shunder Pass into the Mustauj valley, and entered the valley of Wakhán by the Baroghil Pass, striking the Oxus at Sarhad, and thence following the ordinary route to Faizábád.

Towards the end of February 1880, after a diversion to the south to the Daraim valley, he continued his journey, practically following the western and northern route of the Havildar, mentioned in former reports, to Rustak and Koláb, and again crossing the Oxus at Samti. From Koláb he left the Havildar's route, and proceeded up the Doába valley to Robát, from which point, having found the Kún-i-Gan Pass into Darwáz impracticable, he retraced his steps nearly to Koláb, and crossed into the Dara Imám valley (nearly parallel with the Doába valley), and having followed it to its head, crossed by the Walwalak Pass into the Oxus valley, following the north bank of the river north-eastwards over ground previously unexplored to Kila Khum, where he re-struck the Havildar's route. This he followed south-east to the junction of the Wanj with the Oxus, when he crossed to the south bank, reaching Varv, where (like the Havildar) he was stopped by native hostilities. Retracing his steps as far back as the Imám valley, he then followed the Nayán to its junction with the Oxus, crossing the latter at Kisht, and ascending the table-land of Shiva by a route hitherto wholly unknown, which took him across central Badakshán into the upper basin of the Oxus, which he struck a little above Kilah Bar Panjah. He now proceeded northwards down the river, passing near Kila Wamar, and once more reaching Varv, by a circuitous south-western detour, thus securing an important link hitherto wanting to complete the course of the Oxus. Returning to Kila Wamar, he went north-east up the Bartang or Murghabi valley to Sarez, its highest inhabited point, finding conclusively that the Bartang rises in the Sarez Pamir, and is not a continuation of the Aksú; the latter river was reported to merge in the Sochan, which joins the Shákh Dara at Yamraj, entering the Oxus above Kilah Bar Panjah. After retracing his steps to the latter place, the explorer followed the Shákh Dara valley south-east, but found

the southern passes blocked with sand, necessitating a return. His way back to India was down the Oxus, southwards to Ishkásham, which he had touched on the road to Faizábád, and eastward to the Baroghil Pass, where he visited the Gház Kol Lake, determining its position. Independently of the entirely new ground traversed during this long journey the details supplied combine with previous surveys to furnish a nearly complete delineation of the great bend in the Panjah river in its downward course from Wakhán, before it is known as the Oxus.

This important piece of work is clearly illustrated by a special sketch-map (scale 12 miles to the inch) of the whole region, showing the collecting area of the upper Oxus and its chief tributaries, with its circuitous northern loop through Darwáz—a small piece of its course, some 30 miles between Kisht and Samti, alone remaining to be defined.

(2) Explorations on the frontiers of Sikkim by two natives, illustrated on a map (scale 16 miles to the inch). One of them, Babu D. C. S., attached to the Educational Department, and also trained by Nain Singh, started in 1879 from Jongri, in Sikkim. He crossed the Kanchinjinga range to Yamga-tshal in Nepal, on one of the upper affluents of the Tambur, then taking the route which sometimes skirts, sometimes crosses, the western spurs of Kanchinjinga, and visiting the monastery of Taschichoding near Giamsar (Hooker's Khamba-chen); he then crossed the formidable Chatang Pass, on the Nepal and Tibet borders, to a plateau at the head of the Zemu river, in Sikkim, and also the easier pass of Chorten Nyima Kang into the Tibetan province of Chang, which he traversed by a route to the west of Khamba Jong, eventually reaching Shigatze, south of the Sanpo.

The work of the other native, G. S. S., is less satisfactory; he ascended the Arun valley, in Nepal, to the Popte water-parting which forms the boundary of Nepal and Tibet, and reached the Tibetan village of Karta, where he was stopped. His information, therefore, is chiefly on routes in Nepal.

Captain Harman has made the most of this explorer's few notes, and in the Appendix supplies a memorandum on the data for the map, which includes also the route of G. M. N., another explorer, from Shigatze to Khamba Jong in 1880, as well as those of former explorers, and some of the results of the work of the Darjeeling survey party (especially that of Mr. W. Robert) in 1879–82. Captain Harman adds a memorandum on the longitude of Shigatze, for which he adopts the position of 88° 54′ as the most probable value.

(3) A preliminary account of explorations over an extensive area in Great Tibet, to the north and east of the regions reached by Nain Singh, and made by his pupil and former companion A——k, who returned to Calcutta after an absence of four years so recently that there has not been time for the reduction of his observations, the translation of his journals, or the construction of a map. This persevering traveller contrived not only to secrete and preserve his journals, but also his scientific instruments, notwithstanding that on two occasions he was robbed of the greater part of his property. The brief particulars given in the report are practically the same as those already published in our 'Proceedings' for February last, pp. 99–101. The chief geographical result of his journey is that it sets at rest the frequently mooted question whether the Sanpo flows into the Irawadi or into the Brahmaputra. If the former, the explorer must (as mentioned in the former notice) have crossed it three times, first between Batang and Sama, secondly between Sama and Alanto, and finally at Chetang. He maintains that he only crossed it at the latter place, and that to the west of his route between Sama and Alanto, there is a great range of hills, forming the water-parting between the affluents of the Sanpo and those of the well-known system of parallel Tibetan rivers which he crossed between Batang and Sama. He is stated to know the Sanpo well, to have crossed it frequently and in various places, and to be satisfied that none of these affluents can possibly be identical with it. A full account of his explorations is stated to be intended to be got ready for publication with maps, probably within six months of the issue of the Report.

Accounts of tidal and levelling operations (including some interesting notes on the results of the earthquake of 31st December, 1881, illustrated by a special

chart and two diagrams of curves), and of electro-telegraphic longitude operations are also given; and the account of the business of the several Head-quarters includes some valuable technical remarks by Major J. Waterhouse on the work done in the Photographic Branch. The success of this indefatigable officer's scientific labours is well shown by the frontispiece of the Report, which is a view of Kanchinjinga reproduced by his process of heliogravure.

In addition to the maps, &c., above noticed, the Report contains a general map of India, showing the progress of the Imperial Surveys to 1st October, 1882; a map of the Eastern frontier series of triangles from Mergui to Lower Siam (scale 30 miles to an inch); and twenty-one maps illustrating the topographical and other surveys noticed in the text.

AFRICA.

Crozals, J. de.—Les Peulhs. Étude d'Ethnologie Africaine. Paris (Maisonneuve): 1883, 8vo., pp. 271 [no index]. (*Dulau*: price 5*s.*)

After a general review of the geographical distribution and affinities of the African races, entirely derived from German authorities, the author analyses and discusses in detail all former notices of the Fulahs (known also as Fullos, Foulis, Pholeys, Foulahs, Foulanies, Fellans, Fellatahs, with various other modifications), for the Senegambian representatives of which race he adopts the form 'Peulhs' employed by Hecquard, based on the root of the 'Pullo' of Barth (plural 'Fulbe'). It is considered by Dr. Crozals that such a work as this is practically needed, in the face of the preponderance evidently destined for France in the basin of the Niger and its affluents.

AUSTRALASIA.

Geiseler, —.—Die Oster-Insel. Eine Stätte prähistorischer Kultur in der Südsee. Bericht des Kommandanten S. M. Kbt. *Hyäne*, Kapitänlieutenant Geiseler, über die ethnologische Untersuchung der Oster-Insel (Rapanui) an den Chef der Kaiserlichen Admiralität. Berlin (Mittler & Sohn): 1883, 8vo., pp. 54, map and 21 plates. (*Dulau*: price 3*s.*)

This report of Commander Geiseler, who in the Prussian gunboat *Hyœna* visited Easter Island on 20–25 September last, is an extract from No. 44 of the Supplementary Papers to the German Marine official publication, and, though naturally of most interest to ethnologists, may be taken as itself supplementing the paper by Mr. J. Linton Palmer in our 'Journal,' vol. xl. p. 167, and the illustrated account by M. Alphonse Pinart in the 'Tour du Monde,' vol. xxxvi. p. 225. The visits of the *Topaz* and *Seignelay* in 1868 and 1877, which afforded opportunities for these two writers, are recorded with others in an introductory note to the report, though the accounts themselves would seem to be unknown to its author.

Commander Geiseler, after giving brief details of daily work during his visit (including the positions of some of the prominent points), discusses more elaborately:—1, the hydrographic and generally interesting features; 2, the prehistoric aspects; and 3, the ethnographical, subdivided under Population (now only 150 souls, of whom 67 are males, 39 females, and 44 children, two-thirds of the whole living at Matavéri, where Mr. Salmon, the representative of the Tahitian firm of Brander & Co., lives), Races and types, Language, Numeral system, and Habits and customs. The latter subdivision is copiously treated under various headings, and with the short vocabulary and anthological fragments and 87 ethnographical objects enumerated and briefly described in the Appendix, will doubtless prove of special value to Prof. Bastian, of the Berlin Museum, at whose desire Commander Geiseler appears to have been detached for this service.

The map laid down by the officers of the Chilian corvette *O'Higgins*, and from which our Admiralty chart is taken, is reproduced here, and stated to be in general points correct. Some few corrections are made in the text (p. 5), and our Admiralty chart is stated to give the soundings for the most part as somewhat less

deep than in the original. Two original profiles are also given, with original representations of the curious prehistoric and other objects for which the island is famed, including a sketch of the positions of the ancient stone-houses on the south-west slope of the crater of Rana Kâo (or Terano-Kau).

GENERAL.

Nordenskiöld, A. E.—Om Bröderna Zenos Resor, och de äldsta Kartor öfver Norden. Stockholm (Central-Tryckeriet): 1883, 8vo, pp. 60, maps and facsimile.

This elaborately worked out and admirably executed dissertation was read before the Swedish Academy of Science on 12th April last, and is a part of the distinguished traveller's 'Studier och Forskningar föranledda af mina Resor i Höga Norden,' a popular scientific supplement to the account of the voyage of the *Vega* now in course of publication.

It consists of a Swedish translation of the often discussed account published by Marcolini in 1558 of the travels of the brothers Zeni, chiefly familiar to English readers from the masterly analysis by our late Hon. Secretary, Mr. R. H. Major, in the publications of the Hakluyt Society. The original map of the Zeni is reproduced, with the 1561 version of it by Ruscelli in his edition of Ptolemy, a part of Northern Europe from the Cosmographia, the 1483 world-map of Petrus de Alyaco (Pierre d'Ailly), Northern Europe from Donis's edition of the Cosmographia, Bordone's 1547 Scandinavia, the world-map in the British Museum by Martellus Germanus of (*circa*) 1489, Scandinavia and the world-map from Pedrezano's 1548 edition of Ptolemy, Northern Europe from Olaus Magnus, 1567, Andrea Bianco's 1436 MS. map of the North, the 1532 Bâle 'Typus cosmographicus,' the north-west part of Frisius's 1522 map, and a facsimile in colour of the oldest known map of the North, by Claudius Clavus, with its accompanying descriptive text. This, the first to contain a representation of Greenland, bears the date of 1427, and was discovered by Baron Nordenskiöld himself in a MS. copy of Ptolemy's Cosmographia, preserved in the Municipal Library at Nancy. The author, also referred to as Claudius Cimbricus, appears to have compiled this pre-Columbian chart at the instigation of Cardinal Gulielmus Filiastrus. It includes the north of England, Scotland, Ireland, the Orkneys, Iceland, the Danish and Scandinavian peninsulas (including the Baltic apparently to its head, near which are depicted Stockholm and Gothland, and with its eastern shore), and on the extreme west a part of eastern Greenland (with the sole legend "Gronlandia Provincia"), connected with the extreme north of the Scandinavian peninsula by a mythical shore-line north of the Arctic ocean. In the extreme north of Norway as drawn, but considerably lower down on its western face when the peninsula is turned into its proper position, appears also "Engromelandi," which represents the "Engronelant" of Donis.

A careful analysis of all this material, which represents the existing knowledge at the time of Marcolini's publication of the Zeni narrative, has resulted in the following deductions by Baron Nordenskiöld :—

1. That the map of the Zeni must be based on an old sea-chart of the north, constructed before 1482, and probably brought home from Frisland by Antonio Zeno.

2. That we do not know of any exact copy of the original itself, though we do know of two that are more or less altered, namely the chart of Zeno the younger, printed in 1558 and 1561, and Donis's, printed in 1482. On the first, the old distribution of land and sea has been almost exactly adhered to, but on the other hand it has been adapted to the narrative by the addition of various names which appear in the text, such as the islands of Icaria, Bres, Brons, Trans, Iscant, &c., by making the Færö and Shetland Islands disproportionately larger, and lastly, by adding longitudes and latitudes, the latter being generally too far north. All these alterations are less decided in the first edition of Donis's chart. Here, however, we find the well-conceived alteration that Greenland has been moved further north, to give it a position more in accordance with later determinations by compass observations, and with the geographical ideas of the time.

3. That if both these charts are not independent compilations from the

original one, the richer and more correct chart of the Zeni, both as to names and details, must be the elder.

4. That the chart of the North which Zeno brought home must be regarded, from a cartographical point of view, as extraordinarily good for the time, almost, indeed, on a par with Andrea Bianco's chart of the Mediterranean.

5. That the chart of the Zeni must give the result of experience gained during repeated voyages in these regions by intelligent seamen, probably before the introduction of the compass in the north.

6. That we must conclude from this, that towards the end of the fourteenth, possibly in the fifteenth century, voyages to the north-western [*sic*] part of America were much more frequent than is generally supposed.

7. That the old sea-chart which Admiral Zahrtmann saw in the Copenhagen Library, and which could not afterwards be found, was Nicolai Donis's chart, which was printed for the first time in 1482.

8. That the east coast of Greenland at that time was less encumbered with ice than at present, because that now inaccessible coast could then be properly charted.

9. That the younger Zeno has left in the book published by Marcolini a generally truthful sketch of the sojourn of two Venetians with a northern rover, who established himself on one of the Færö Islands, and from thence plundered the neighbouring countries, visiting amongst other places a remarkable monastery, probably situated on the east coast of Greenland, and a harbour situated somewhere on the south coast.

10. That fishermen from the rover's head-quarters were driven by a storm to the mainland of America, and there, in Newfoundland and Canada, saw the remains of small communities originally founded by Europeans; also that these fishermen were compelled by circumstances to make extensive journeys in the interior of the American Continent, of the social conditions of which they have left some graphic pictures.

Ullrich, Valentin.—Die horizontale Gestalt und Beschaffenheit Europa's und Nordamerika's. Ein Beitrag zur Morphologie beider Erdenräume. Leipzig (Duncker & Humblot): 1883, 8vo., pp. 182. (*Williams & Norgate*: price 4s.)

This treatise on the horizontal configuration and composition of Europe and North America originally appeared in 1882 as an academic lecture before the Bavarian State School. Europe and North America are associated as being geographically two highly organised individuals of the same species, as it were, the latter being practically as much a separate continent as the former.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

Telegraph Map of the World.—Map of the World showing the Submarine Telegraph Cables manufactured and laid by the Telegraph Construction and Maintenance Company, Limited, together with other Telegraph Lines. Mercator's Projection, Equatorial Scale 16½° to an inch. F. Le-B. Bedwell, R.N., del. Telegraph Construction and Maintenance Company, Limited, London, 1883.

EUROPE.

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st January, 1883.

25-inch—Parish Maps:—

England: **Bedford**: Arlesey 9 sheets; Barton in the Clay 11, and Area Book; Eversholt 8, and Ar. Bk.; Harlington 8, and Ar. Bk.; Higham Gobion 8, and Ar. Bk.; Milton Bryant 6, and Ar. Bk.; Potsgrove 6, and Ar.

Bk.; Pulloxhill, Ar. Bk.; Shitlington and Do. (Det., Nos. 7 and 8) 16, and Ar. Bk.; Streatley 8, and Ar. Bk.; Tingrith 6, and Ar. Bk.; Toddington 16, and Ar. Bk.; Stotfold 8; Upper Stondon 3, and Ar. Bk.; Westoning 9, and Ar. Bk.; Woburn 11, and Ar. Bk. **Cornwall:** Quethiock 13; St. Pinnock, Ar. Bk. **Derby:** Allestree, Ar. Bk.; Quarndon, Ar. Bk. **Gloucester:** Alderley 7; Beverstone 6, and Ar. Bk.; Hawkesbury 25; Tetbury 15; Wotton-under-Edge 15; Weston Birt with Lasborough, Ar. Bk. **Monmouth:** Caerwent, Ar. Bk.; Caldicot, Ar. Bk.; Llangattock-Vibon-Avel 11; Llanvihangel-Ystern-Llewern 8, and Ar. Bk.; Llantrissent, Ar. Bk.; Llanfrechfa, Ar. Bk.; Llandegveth, Ar. Bk.; Llanvair Discoed, Ar. Bk.; Llandewi-fach, Ar. Bk.; Llanvaches, Ar. Bk.; Parc Grace Dieu, Ar. Bk.; Penhow, Ar. Bk.; Shire Newton, Ar. Bk.; St. Bride's Netherwent, Ar. Bk.; St. Maughans, 5; Usk, Ar. Bk. **Norfolk:** Attlebridge 5; Crostwick, Ar. Bk.; Felthorpe 7; Newton Flotman, Ar. Bk.; Stoke Holy Cross, Ar. Bk. **Shropshire:** Acton Burnell 7; Atcham 14, and Ar. Bk.; Beckbury 8, and Ar. Bk.; Berrington 11, and Ar. Bk.; Boningale, Ar. Bk.; Cardeston, Ar. Bk.; Ryton, Ar. Bk.; St. Julien, Ar. Bk.; Wroxeter, Ar. Bk.; Condover, 17; Cressage 6, and Ar. Bk.; Eaton Constantine 5, and Ar. Bk.; Great Hanwood 4, and Ar. Bk.; Leighton and Do. (Det.) 8; Pontesbury and Ford (Det) 23, and Ar. Bk. **Suffolk:** Aldeburgh 7; Aldringham with Thorpe 5; Boulge 3, and Ar. Bk.; Brandon (Part of) 10, and Ar. Bk.; Brantham 8; Culpho 4, and Ar. Bk.; Elveden 13; Eriswell 16; Hazlewood 7; Iken 8; Mildenhall 28; Santon Downham 6, and Ar. Bk.; Sproughton, Ar. Bk.; Stutton 10, and Ar. Bk; Sudbourne 15.

Index Map:—

Index to the Ordnance Survey of Sussex. (Scale 3 miles to 1 inch.)

Publications issued from 1st to 28th February, 1883.

1-inch—General Maps:—

England and Wales: Sheet 257 (in Outline).

Ireland: Sheet 163 (Hill-shaded).

6-inch—County Maps:—

England: Derby Quarter Sheets 9 S.W.; 10 N.W.; 10 N.E.; 11 S.W.; 12 S.W.; 16 S.W.; 16 S.E.; 17 N.W.; 18 S.E.; 19 N.E. (21 N.E. with Stafford 1 N.E.); (21 S.E. with Stafford 1 S.E.).

Ireland: Cavan (revised). sheet 39. Longford (revised), sheets 6, 9, 11, 12, 16, 20, 21, 25.

25-inch—Parish Maps:—

England: **Bedford:** Astwick 4 sheets; Campton 4; Edworth 6; Langford 6. **Cornwall:** Cardinham 20; St. Martin 9, and Ar. Bk.; St. Neot 27; Temple 3. **Derby:** Aston upon Trent 8, and Ar. Bk.; Calke 5; Chellaston 4; Derby Hills Township 4; Doveridge and Do. (Det., No. 1) 9, and Ar. Bk.; Foremark 7; Marston on Dove, and Rolleston (Det., No. 1) 11, and Ar. Bk.; Melbourne 9; Repton 12; Scropton 10, and Ar. Bk.; Stanton by Bridge 7; Swarkeston 5, and Ar. Bk.; Ticknall 10; Weston upon Trent 6, and Ar. Bk. **Gloucester:** Boxwell with Leighterton 7, and Ar. Bk.; Broughton Poggs (Det.) 3, and Ar. Bk.; Ozleworth 7; Shipton Moyne 6; **Norfolk:** Blofield 7; Colton 4; Easton 6; Great Melton 10; Hainford 7 and Ar. Bk.; Hethersett 8, and Ar. Bk.; Honingham 10; Horstead with Stainighall 10, and Ar. Bk.; Marlingford 5; Postwick 6; Ringland 7. **Shropshire:** Habberley 5; Kemberton 6, and Ar. Bk.; Kenley 5; Minsterley 8; Pitchford 7, and Ar. Bk.; Posenhall 4; Sheinton 5, and Ar. Bk.; Stapleton 8, and Ar. Bk.; Uppington 5, and Ar. Bk.; Westbury 22; Wollaston 12; Wombridge 6, and Ar. Bk.; Wrockwardine and Do. (Det. Nos. 1 and 2) 19, and Ar. Bk. **Suffolk:** Burgh 6; Grundisburgh 7.

Publications issued from 1st to 31st March, 1883.

1-inch—General Map:—IRELAND: Sheet 113 (Hill-shaded).

6-inch—County Maps:—

ENGLAND: Berks, sheet 41 with Wilts sheet 37 and Hants sheet 1. Hertford, sheet 35. Hertford, sheet 5 with Essex sheets 1, 2, 7, 8. Wilts, sheet 55 with Hants sheet 22. Wilts, sheet 61 with Hants sheet 30.

25-inch—Parish Maps:—

ENGLAND: **Bedford**: Arlesey, Ar. Bk.; Astwick, Ar. Bk.; Campton, Ar. Bk; Chicksands Priory, 5 sheets, and Ar. Bk.; Clifton 6, and Ar. Bk.; Clophill 6; Edworth, Ar. Bk.; Henlow 8; Langford, Ar. Bk.; Lower Gravenhurst 4, and Ar. Bk.; Meppershall 6, and Ar. Bk.; Shefford 2, and Ar. Bk.; Shefford Hardwick 4, and Ar. Bk.; Silsoe 8; Stotfold, Ar. Bk.; Upper Gravenhurst 7, and Ar. Bk. **Cornwall**: Blisland 16; Braddock, Ar. Bk.; Duloe, Ar. Bk.; Landulph 7; Liskeard, Ar. Bk.; Menheniot, 16; Pelynt, Ar. Bk.; Quethiock, Ar. Bk.; Temple, Ar. Bk. **Derby**: Area Books of the following Parishes:—Calke; Derby Hills Township; Foremark; Melbourne; Stanton by Bridge; Ticknall. **Gloucester**: Area Books of the following Parishes:—Alderley; Hawkesbury; Ozleworth; Tetbury; Wotton-under-Edge. **Monmouth**: Cwmcarvan, Ar. Bk.; Gwernesney, Ar. Bk.; Henllys 11, and Ar. Bk.; Kemeys-Inferior 8; Llanbadock, Ar. Bk.; Llangattock juxta Caerleon 11; Llangattock-Vibon-Avel, Ar. Bk.; Llangibby, Ar. Bk.; Llanmartin 5; Llanvihangel Pontymoil, Ar. Bk.; Malpas 4; Newchurch, Ar. Bk.; Penrhôs, Ar. Bk.; Pen-y-Clawdd, Ar. Bk.; Rockfield 9; St. Maughans, Ar. Bk.; Tredunnock, Ar. Bk. **Norfolk**. Area Books of the following Parishes:—Attlebridge; Barford; Blofield; Bracon Ash; Carleton Forehoe; Colton; Crownthorpe; Dunston; East Carleton; Easton; Felthorpe; Flordon; Great Melton; Hethel; Honingham; Ketteringham; Marlingford; Morton on the Hill; Postwick; Ringland; Weston Longville; Wramplingham; Wreningham. **Shropshire**: Area Books of the following Parishes:—Acton Burnell; Condover; Cound; Habberley; Leighton and Do. (Det.); Minsterley; Posenhall; Westbury; Wollaston. **Stafford**: Enville 12, and Ar. Bk.; Himley 7, and Ar. Bk. **Suffolk**: Aldeburgh, Ar. Bk.; Barton Mills 5; Brantham, Ar. Bk.; Burgh, Ar. Bk; Elveden, Ar. Bk.; Eriswell, Ar. Bk; Grundisburgh, Ar. Bk.; Hazlewood, Ar. Bk.; Iken, Ar. Bk.; Mildenhall, Ar. Bk.; Snape 7; Sudbourne, Ar. Bk.; Tuddenham 9; Wantisden 6.

Town Plan—scale 1:500:—

ENGLAND: Banbury, 23 sheets.

Index Map—SCOTLAND: Index to the Counties of Perth and Clackmannan. Scale 3 miles to 1 inch.

Schweiz, Kleine officielle Eisenbahnkarte der——. Herausgegeben vom Schweizer. Post- und Eisenbahn-Department. Scale 1:500,000 or 6·8 geographical miles to an inch. Lausanne. Price 1*s.* 6*d.* (*Dulau.*)

Spain.—Mapa Topográfico de España en escala de 1:50,000 or 1·4 inches to a geographical mile. Comienza su publicacion el Instituto Geográfico y Estadístico bajo la direccion del Excmo. Señor Don Cárlos Ibañez é Ibañez de Ibero, Director General. Madrid. Sheets:—No. 604. Villaluenga, No. 606. Chinchon, and No. 629. Toledo.

ASIA.

Bock, Carl.—Originalskizze einer Reiseroute von Bangkok zum Mekóng, aufgenommen und gezeichnet von Carl Bock, 1882. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Seite 162. (*Dulau.*)

Cochinchine Française, Carte de la——, réduction de la grande carte de M. Bigrel. Price 2*s.* 6*d.* (*Dulau.*)

AFRICA.

West Equatorial Africa.—Uebersichtskarte der neuesten Forschungsreisen im äquatorialen Westafrika. Entworfen und gezeichnet von B. Hassenstein. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Taf. 6. Justus Perthes, Gotha. (*Dulau.*)

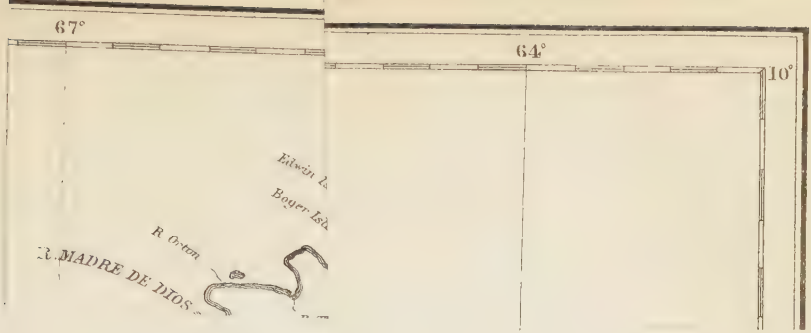
CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in March and April 1883.

No.			Inches.	
359	m	=	0·32	Japan:—Nagasaki to Karatsu, with the Goto islands. (Plans, Tama no Ura. Hardy harbour. Okushi harbour. Nama Ura.) Price 2*s.* 6*d.*
287	m	=	0·24	Borneo, northern part:—From Gaya bay on the west, to Sandakan harbour on the east, including South Banguey channel, and the south-western part of Cagayan Sulu. Price 2*s.* 6*d.*
491	m	=	various.	West Indies:—Anchorages in Guadeloupe and the adjacent islands—St. Anne anchorage. Port du Moule. St. François anchorage. Port Louis. Basse-Terre. Galet anchorage. Saintes anchorage. Grand-Bourg. Price 1*s.* 6*d.*
2864	m	=	1·75	North America, east coast:—Beaufort harbour. Price 1*s.*
2622	m	=	3·0	Shetland isles:—Fair isle. Price 1*s.*
844	m	=	3·0	Sea of Marmara:—Erekli bay. Palatia and Mermerjik bays. Rodosto roads. Karabuga bay. Gemlik bay. Mudania roads. Panderma bay. Kalolimno island. Price 1*s.* 6*d.*
439	m	=	various.	Central America, west coast:—Ports and anchorages—Istapa or Isla Grande bay. Sihuatanejo. Petatlan. Tequepa or Papanoa. Guatulco, Santa Cruz, and Tangola Tangola. Maldonado. Angeles. Sacrificios. Price 1*s.* 6*d.*
1048	m	=	0·1	Australia, west coast:—Buccaneer archipelago to Bedout island. (Plan, Beagle bay.) Price 2*s.* 6*d.*
613	m	=	0·13	Australia, north coast:—Melville island with Dundas and Clarence straits. (Plan, Vernon islands.) Price 1*s.* 6*d.*
1754	m	=	0·24	China:—Ragged point to Wên-chau bay. Price 2*s.*
1759	m	=	0·24	China:—Wên-chau bay to Kweshan islands. Price 2*s.*
159	m	=	6·0	South America, west coast:—Puerto del Morro. Cockle cove and approaches. Price 1*s.* 6*d.*
548	m	=	3·0	South America, east coast:—Maldonado bay. Price 1*s.* 6*d.*
2880	m	=	1·78	North America, east coast:—New Bedford harbour. Price 1*s.*
438	m	=	4·9	France, north coast:—Boulogne. Price 1*s.*
2094	m	=	0·8	England, west coast:—Isle of Man. (Plans, Ramsey bay. Douglas harbour. Castletown bay. Port St. Mary. Calf sound. Port Erin. Peel.) Price 4*s.*

451 Plan added, Ocho Rios bay.
2723 Plan added, Pulo Dama.
2369 Plan added, Pillau harbour.

(*J. D. Potter, agent.*)



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2723 Plan added, Pulo Dama.
2369 Plan added, Pillau harbour.
(*J. D. Potter, agent.*)

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Annual Address on the Progress of Geography for 1882–3.

By the Right Hon. Lord Aberdare, F.R.S., President.

(Delivered at the Anniversary Meeting, May 28th, 1883.)

In the few remarks which I had occasion to make on opening the present Session of the Society in November last, I reviewed some of the more important geographical events that had occurred since the previous Anniversary. Among other matters I referred to the great loss which the Society had sustained by the lamentable death of Captain Gill, and gave a sketch of his career as a geographer. To this subject, and to the happy return of Mr. Leigh Smith and the crew of the *Eira*, on which I also dwelt on that occasion, I need not further allude than by saying that an account of the voyage of the *Eira* and the escape of the crew, drawn up by Mr. Markham from Mr. Leigh Smith's diary, was read before the Society by Dr. Neale at one of our meetings in February, and has been duly published in our 'Proceedings,' accompanied by extracts from the diary itself; and also that Mr. Leigh Smith has since testified his gratitude for the sympathy which he received from the Society by contributing the handsome sum of 1000*l.* towards the expenses of expeditions.

The return of our gallant countryman after his perilous six weeks' boat journey to Novaya Zemlya, and his safe conveyance home in the *Hope*, sent by the Relief Committee under the command of Sir Allen Young, do not exhaust the noteworthy events of Arctic adventure and enterprise which have occurred since our last Anniversary. During the summer the whole of the remaining expeditions equipped by various countries for the purpose of founding stations for scientific observations in North Polar regions, left for their destinations, and from most of them news was received before the winter closed in of their being comfortably established. These observatories in the north are nine in number, forming an irregular ring round the Pole. From west to east they are in the following order: 1. The

Austro-Hungarian station on the island of Jan Mayen, the party for which was landed on the 13th of July; 2. The Norwegian, at Bosekop, in Lapland, which commenced operations on the 1st of August; 3. The Swedish, in Ice Fiord, Spitzbergen, which was visited by our Associate Mr. Heneage Cocks in September, and was found to be in full activity, observations having commenced on the 15th of August; 4. The Russian (western) station in Möller Bay, Novaya Zemlya; 5. The eastern station of the same nationality on Sagastyr Island, at the mouth of the Lena, which was established on the 10th of August, and was visited some days afterwards by Messrs. Schutze and Harber, two American gentlemen who had been engaged in the search for possible survivors of the ill-fated *Jeannette* expedition; 6. The United States western station near Point Barrow; 7. The English station at Great Slave Lake; 8. The eastern United States station in Lady Franklin Bay; and 9, the German, in Cumberland Sound, Davis Straits. Both the stations of the United States Government were founded in the summer of 1881; that at Point Barrow has been since visited and relieved, but the attempt made last summer, according to pre-arrangement, to carry succour to the station at Lady Franklin Bay, unfortunately failed, the relief ship *Neptune* being unable, notwithstanding the most persevering efforts, to pierce the ice-obstruction in Smith Sound. The party there established is a large one, consisting of twenty-four men under the command of Lieutenant Greely, and we can only hope that no sufferings have been entailed by the failure to renew their supplies. Another station, which would have made the 10th, was to have been founded by Holland, at Dickson Haven at the mouth of the Yenisei, but the party despatched for that purpose in the *Varna* did not reach its destination, the vessel having been caught by the ice on the 21st of September and frozen up for the winter in the Kara Sea. Two stations which are about to be established in Antarctic regions remain to be mentioned; one French, at Cape Horn, the other German in the island of South Georgia.

Although geographical exploration forms only a very subordinate part of the work marked out for these stations, the object of their promoters being chiefly the collection of data for the solution of important problems in terrestrial magnetism and meteorology, yet geographical science in its best and widest sense cannot fail to be greatly benefited by their success. They are a striking result of international co-operative effort in a scientific direction.

The expedition which I mentioned in my former address as being in preparation by the enterprising young Danish officer Lieutenant Hovgaard, sailed from Copenhagen under promising auspices in the *Dijmphna* on the 18th of July; the cost being provided for by the munificence of M. Gamel of that city. Lieutenant Hovgaard's object was to follow in the track of Nordenskiöld—with whom he served in the *Vega*—as far as Cape Chelyuskin, and to ascertain whether Franz-

Josef Land extends to the neighbourhood of that promontory, as he supposed it does, from certain indications observed by him on his former voyage. Unfortunately his progress was arrested, like that of the Dutch expedition in the *Varna*, by ice in the Kara Sea, where it is believed he has passed the winter.

During the past summer the survivors of the ill-fated *Jeannette* expedition—the fate of which excited such painful interest in this country—returned home, and Engineer Melville delivered his official report of the search and discovery of the remains of Commander De Long and his companions, which has been published, with a map of routes. The parties sent along the Siberian coast in search of possible survivors of the third boat also returned. Mrs. De Long is now engaged in writing a narrative of the expedition from her husband's journals, and meantime Mr. Gilder, of the search and relief expedition in the *Rodgers*, who made a hazardous winter journey through North-Eastern Siberia, after the burning of that ship in its winter quarters, has published an account of the search for the *Jeannette* under the title of 'Ice-pack and Tundra.'

The Arctic campaign of the present year has commenced with as much spirit as ever. Baron Nordenskiöld is first in the field with a new expedition to Greenland, where he intends to make a vigorous effort to penetrate into the interior of that ice-bound land, and test the accuracy of his surmises, founded on excellent reasoning from meteorological data, that central valleys exist enjoying a comparatively warm and dry climate. This expedition, in which a competent scientific staff will aid its experienced and accomplished leader, has recently left for its destination, and has excited much public interest in this and other countries of Europe. The Danes also are sending an expedition to the same region, under Lieutenant Holm, whilst the gallant and persevering Dutch explorers in the little *Willem Barents* have started on their fifth Arctic cruise to the Barents Sea, having in view, besides geographical research, the rescue of the *Varna* and the *Dijmphna*.

With regard to Africa, the exploration which is naturally of most interest to the Fellows of the Society is that recently commenced by Mr. Joseph Thomson, under the direction of your Council. This new expedition has for its object, as you have already been informed, one of the routes marked out as a desideratum in the geography of the continent by the African Exploration Committee in 1877, viz. from Mombasa, by Kilimanjaro, to the south-east shore of Victoria Nyanza, but with the addition that the return journey is to take in the hitherto unvisited Mount Kenia. Regarding Mount Kilimanjaro, we have already a fair knowledge at least of its southern slopes, through the two visits of the Baron von der Decken, on the second of which, in 1862, he ascended with Dr. Kersten to an altitude of 13,900 feet, but did not reach the snow-line, which was 2000 feet above his position, and from

the subsequent visit of Mr. Charles New in 1871, who reached the snow, and formed a valuable collection of the flowering plants at a great altitude. Mr. Thomson's intention is to pass round the northern foot of the mountain mass, and thence take as direct a route as practicable to Kavirondo, on the shores of the lake. According to our latest news from Zanzibar, he had organised a caravan of 150 men at Mombasa and the mission station of Rabbai, near that port, and happily escaping the usual tedious delays near the coast, had reached Bura, about 100 miles in the interior, on the 25th March, expecting to arrive at Taveta, near Kilimanjaro, where a caravan route branches off to the north-west, on the 1st of April. By thus taking the northern route, Mr. Thomson will avoid going over the same ground as Dr. Fischer, a German naturalist of great skill and experience, who was then near the southern foot of Kilimanjaro. Of the extensive tract of country between Mount Kilimanjaro and the lake we know nothing except from native reports; these, however, have been gathered and collated with great diligence and discrimination by two competent geographers, acquainted with the native languages, namely the Rev. Thos. Wakefield of Ribé, near Mombasa, and Archdeacon Farler of the Universities' Mission, who has resided for several years at Magila, in Usambara, not far from the threshold of the unknown region. Their reports and maps have been published in recent numbers of our 'Proceedings,' and it is satisfactory to note that they agree in the main, at least as far as regards the routes followed by the Arab caravans. North of Kilimanjaro a ridge of very elevated land seems to extend towards the Galla country, the snow-capped Mount Kenia rising on its eastern edge; but to the west an extensive plain, at an elevation of probably 3000 or 4000 feet, stretches towards Lake Victoria—a plain peopled by the pastoral and flesh-eating Masai, whose marauding parties carry terror to the more peaceful settlements of the agricultural negroes nearer the coast. So little is known of this tribe, that the details lately communicated to us by Mr. Last, who has visited one of their settlements near the southern border of their country, were extremely welcome. Trading caravans from the sea-coast, which periodically traverse the Masai country, are compelled to be well armed and to fortify their nightly camps in passing through the more dangerous districts. According, however, to Mr. Last, the Masai are too cowardly to attack a well-armed party, and we have full confidence that our young leader, who has on former occasions shown much courage and tact in dealing with hostile natives, will be able to carry out his great mission without mishap.

A little further south another of those great journeys across the entire continent, which formerly attracted so much public attention, has been carried to a successful conclusion. Lieutenant Wissmann, who started in company with Dr. Pögge from St. Paul de Loanda in January 1881, reached Zanzibar viâ Nyangwe, on the Lualaba and Ujiji, in November 1882.

The two travellers together, before reaching Nyangwe, explored a wide tract of quite new country, their route crossing that of Lieutenant Cameron at right angles, and lying far to the south of Stanley's. One of the most noteworthy features reported by them of this remote central region, well watered by numerous southern tributaries of the mighty Congo, is the dense population; but for more detailed information regarding these new countries and strange tribes, we must await the publication of Lieutenant Wissmann's narrative. His companion, Dr. Pögge, who returned westward from Nyangwe, to establish a station in fulfilment of the main object of their common mission, may now fairly lay claim to a place in the front rank of African explorers. His first great journey, in 1875, when he reached the capital of the renowned Central African potentate, the Muata Yanvo, and an account of which he has since published under the title of 'Im Reiche des Muata Jamwo' (Berlin, 1880), was of itself a geographical feat of the highest importance, especially as the enterprising explorer brought back with him a collection of the natural products of the region of much interest and value. I cannot, indeed, pass over this subject without acknowledging that we are indebted chiefly to German explorers, among whom we must also reckon Gussfeldt, Pechuel-Loesche, Büchner, Lenz, and Von Mechow, for much of the best knowledge we possess of West Central Africa. The meritorious explorations of the Portuguese expedition under Capello and Ivens, especially in the basin of the Quango, an account of which, with an elaborate map, has lately been published in an English translation, have also greatly contributed to the increased knowledge of the same wide region. North of the Congo we have been recently interested by a report, communicated by Mr. F. Lupton, a young Englishman, occupying the post of Egyptian Governor of the Bahr Gazal district, of the existence of a great lake, which he surmises to be in the basin of the river Welle. We are probably on the eve of some exciting discovery in this part of Africa, which is at present a blank on our maps, the Russian traveller, Dr. Junker, being at present engaged in a persevering attempt to solve the problem of the course of the Welle, in the course of which he will ascertain the existence of the reported new lake. The Welle, according to him, is declared by the natives not to be a northern tributary of the Congo, as believed by some geographers, but to pour its waters into Lake Chad.

Further south and east the area of the unknown central parts of the continent is fast diminishing under the assaults of many enterprising travellers of various nationalities. The Belgian cosmopolitan station at Karema, on Lake Tanganyika, is reported to be in a flourishing condition, and has been reinforced by two new officers, Messrs. Storms and Becker, who reached it in September last, after a journey, wonderfully quick and apparently easy, from Zanzibar. A party of German savants are steadily exploring the district between Karema and Tabora, in

Unyanyembe, from a permanent station midway between those places. A French midshipman, M. Giraud, is on his way to complete the exploration of Lake Bangweolo, the scene of Livingstone's death. A steamer has been despatched, viâ the Shiré and Lake Nyassa, to be transported by Mr. James Stewart's new "lake-junction road" to Lake Tanganyika, where Mr. Hore is ready to put it together and launch it on these inland waters. The region between the Mozambique coast and Lake Nyassa is being explored with most satisfactory accuracy by one of the most skilful of recent travellers, Mr. H. E. O'Neill, consul at Mozambique, whose work is supplemented by the routes followed in his solitary rambles in the remotest parts of the same region by the enthusiastic missionary traveller the Rev. W. P. Johnson. Captain Paiva de Andrada has been surveying the almost forgotten gold districts north and south of the lower Zambesi; Mr. F. C. Selous, to whom we have awarded the Cuthbert Peek testimonial of the present year, is engaged with zeal and success in exploring the difficult country between the Zambesi and the settlements of the Matabele; and our adventurous young countryman, the Earl of Mayo, has just returned from a journey through a district imperfectly known between Mossamedes and Ovampo Land.

Regarding the Congo there is little to report of purely geographical interest; it is known, however, that Mr. Stanley, previous to his late visit to Europe, made a journey of several hundred miles beyond Stanley Pool in a small steamer, and discovered, up a tributary stream near the junction of the Quango, a grand new lake, 75 miles in length. The lake and the whole course of the main river up to that point were carefully surveyed and mapped; but the large amount of new material thus obtained has not yet been made public.

An unusually large proportion of our evening meetings this session has been devoted, as many of you will have been glad to observe, to important papers and discussions relating to Asia. We commenced the session with Mr. Colquhoun's address on the subject of his brilliant journey through the southern provinces of China, from the mouth of the Si-Kiang to the Irawadi, and another of our meetings was occupied by our gold medallist, Mr. Colborne Baber, who gave us some of the results of his observations on China during his seventeen years' residence. A valuable paper on the Native States of the Malay Peninsula has also been read and published; the author, Mr. D. D. Daly, giving the results of his seven years' surveys and explorations, which add greatly to our knowledge of the interior of those fertile regions. Four papers on different parts of Western and Central Asia have had an interest of a different kind. One of them was on Mushkétof's exploration of the Zarafshan Glacier, by Mr. Delmar Morgan; and another, M. Lessar's narrative of his surveys from Askabad within the Afghanistan frontier, nearly to the gates of Herat. The additions to our geographical knowledge resulting from this important survey, and their

practical significance, were pointed out to the Meeting on this occasion, with his usual lucidity, by Sir Henry Rawlinson, and I need not recapitulate them here as they may be assumed to be by this time generally known to geographers and the intelligent public.

We have also had two papers of much interest on Persia; one giving the details of his personal surveys in the Elburz range, by Colonel Beresford Lovett, and the other discussing the subject of the means of communication between Central Persia and the sea, by Colonel Champain. The latter paper was illustrated by a series of route maps, the work of Captain Wells, R.E., which add materially to our knowledge of the topography of this part of Persia, and for the communication of which the Society and all geographers are indebted to Colonel Champain.

The work of the Survey Department of India, under Lieut.-General J. T. Walker, the official Report on which has been received since my last address, includes much of unusual interest to geographers. As a mere matter of scientific mensuration, the operations of the survey year 1881–82 are noteworthy, since they bring to a close the chain of triangles known as the Eastern frontier series, on a base-line of verification at Mergui, thus finishing the principal triangulation of all India. It was on the recommendation of the great Duke of Wellington (then Col. Wellesley) that Major Lambton originated in 1800 the survey of Southern India, from which this vast undertaking has arisen—an undertaking perfected on the lines marked out by Colonel Everest, and sanctioned by the East India Company.

The details of the topographical surveys demand also honourable notice, from the fact of their establishing an accurate knowledge of no less than 9081 square miles of country surveyed on the 1-inch scale, 8627 on the 2-inch, and 6431 on the $\frac{1}{2}$-inch, besides smaller areas on larger scales, and without reckoning the Village, Riverain, or Forest surveys, which cover 3197 square miles, or the Cadastral surveys of the North-Western Provinces, British Burma, and Assam, covering 4924 square miles.

It is, however, in the geographical exploration of new country accomplished under the direction of General Walker that we are most interested; and it is impossible without figures to form an idea of their extent. Thus the surveys and reconnaissances have resulted in additions to the country already mapped of 2750 square miles on the Burma and Manipur boundary, 450 on the Kohat frontier, 5660 in Baluchistan, 180 in East Sikkim, 720 in Nepal, 690 in Tibet, 200 in Dardistan, and 600 in Kishanganga. But even this very extensive increase to our knowledge of localities most important in their bearings on our imperial possessions in Hindostan will perhaps be accepted with less interest than the accounts, contained in General Walker's report, (1) of the route surveys to the west and north of the portions of Sikkim made so long ago as 1879 by an employé of the Educational Department of Bengal, and

during 1880–81 by another employé of the Survey Department, both of which have been recently worked out and mapped by Captain Harman; (2) of the route surveys in and beyond Badakshán, in Roshán, Shignán, and other districts bordering the Panjah river and the collateral affluents of the Oxus, made in the years 1878–81 by M—— S——, another employé of the Survey Department, and which contribute much towards filling in numerous gaps in the existing maps of this region; and (3) of explorations over an extensive area in Great Tibet, to the north and east of the regions reached by the late Pundit Nain Singh, made by his pupil and former companion A—— k, whose return to India after an absence of four years has been too recent to allow time for the reduction of his observations, which are epitomised in our 'Proceedings' for February last, and result in a conviction that the Sanpo and Irawadi are not identical. It is gratifying to record that the two medals placed at the disposal of the Surveyor-General by the late International Geographical Congress at Venice have been reserved for these anonymous explorers, thus worthily continuing the system of recognition of native scientific merit commenced by the heads of the Survey, and the wisdom of which was fully recognised by this Society in 1877, when our Patron's medal was awarded to Nain Singh for his great journeys and surveys on the northern frontiers of India.

The great islands of the Malay Archipelago and Australasia, which have for many years past been the happy hunting grounds of a succession of eminent travellers of various nationalities, attracted by the apparently inexhaustible wealth of their zoological and botanical productions, have recently acquired a new interest for the practical geographer. The pioneers of the North Borneo Company have explored the interior of the northern part of that large island, defining the courses of the rivers, and gleaning a large amount of information regarding the soil and products of the region. Mr. Witti, one of these explorers, unhappily lost his life last summer in an attempt to reach the head of the Sibuco river, on the southern boundary of the company's territories; we had from time to time noticed in our 'Proceedings' the chief surveys made by this scientific officer. Another, Mr. W. B. Pryer, has recently sent to us, through Mr. Cust, a descriptive paper on North-East Borneo and the Sulu Islands containing much new information. Mr. Pryer, on one of his journeys, proved the non-existence of the great lake in the interior to the east of Mount Kini Balu, which had been introduced into our maps on vague native information. The still larger island to the south, New Guinea, was the subject of discussion at one of our recent meetings, when Mr. Wilfred Powell read a paper on his cruise along 1200 miles of the north-eastern coast. In the present scantiness of our information regarding this great island, now become so suddenly interesting to Englishmen, Mr. Powell's description of the harbours and the coast-country at the various points where he landed was very welcome. The

missionaries of the London Missionary Society, established on the south-east coast, have from time to time made short incursions into the interior, and we have just received from the Rev. W. G. Lawes an interesting account of one of these journeys, in which he was accompanied by his wife and visited the Rouna falls on the Laloke river, about 20 miles inland from Port Moresby. M. Miklukho-Maclay, the accomplished Russian ethnologist, who resided among the natives for fifteen months near Astrolabe Bay, visited Europe last year after an absence of twelve years; but this learned traveller has not yet published any account of his extensive travels, beyond a few technical papers on ethnology, and he has now returned to Sydney, where his collections are kept, with the intention of working out his materials at his leisure.

A few words regarding Central and South America before I close. During last winter the Society was favoured with a paper by Mr. A. P. Maudslay on his explorations and discoveries in Guatemala, during which he disinterred from the depths of the forest on the Usumacinta river a group of buildings belonging to the old Indian era, which had not previously been examined. His plans, measurements, and photographs, and specimens of the sculptured slabs were laid before us, only to excite a lively desire to know more of the life of that ancient people who have left us such wonderful proofs of their architectural and artistic skill. Mr. Maudslay considers that he is only at the commencement of his studies, and has long ago returned to Guatemala, with larger means of study than he had on his former visit; we last hear of him as busily employed, with his assistants, in taking casts of the sculptures at Quiriguá. New contributions to our knowledge of South America have been furnished by Mr. R. Blake White, in his paper descriptive of the Central and Western Provinces of Colombia; by Dr. Edwin R. Heath, in the account of his exploration of the river Beni, carried out under discouraging circumstances with wonderful courage and perseverance; and by Mr. Minchin, in his survey of the Bolivian plateau in the neighbourhood of Lake Poopo and the outlets to the drainage of Titicaca.

Mr. Markham has given us a lucid summary of the work of explorers in the basin of the Beni from the time of the later Incas to the present day. The fluvial geography of this part of the South American interior, as clearly pointed out by Colonel Church in the discussion on the reading of Mr. Markham's paper, has an important bearing on the commerce and prosperity of those regions, and thus ought to have great interest for practical men. I cannot pass from this subject without expressing our regret, as geographers, at the untimely death of the enterprising French traveller, Dr. Crevaux, who was conducting an expedition up the Pilcomayo, with the intention of passing from the head waters of that river to one of the southern tributaries of the Amazons. The atlas, of South American rivers, in 40 sheets, published since his death, from

the surveys made during his various journeys, forms another important contribution to our knowledge of the interior of this continent. Lastly, I must record the return of Lieut. Bove and his colleagues, of the Italian Antarctic expedition, who have been exploring to good purpose Southern Patagonia, and a part of Tierra del Fuego. An account of their travels and researches was laid before the Italian Geographical Society last spring, and has been published in the *Bolletino* of the Society.

Captain Sir Frederick Evans, the Hydrographer, has kindly supplied me with the following summary of the work of his department during the year:—

The Admiralty Surveys for 1882, in addition to those in progress on the coasts of the United Kingdom, were continued in the Red Sea and Indian Ocean; also in Western Australia, on the coasts of Corea and Japan, and among the Fiji and Solomon Islands in the Pacific Ocean. In South America, at the entrance of the river Plate and Magellan Strait. At the Bahama Islands in the West Indies, and on the south coast of Newfoundland. These surveys required the services of 76 officers and nearly 600 men, distributed among four sloops of war and seven smaller-class vessels.

Among the more important results are—that in the Red Sea, the Zebayir Islands, Jebel Teïr, Mokhá, with its off-lying shoals, have been charted, connected with each other, and also the Hánish Islands and Aden, by many chronometrical distances. In the Indian Ocean, the Amirante Islands, and the banks of soundings on which they rest, delineated to the 100-fathoms' edge; and the islands Alphonse, Providence, St. Pierre, Glorioso, all dependencies of Mauritius, examined and accurately determined in position relatively to each other, and with Seychelles, Mauritius, and Mozambique. In Western Australia useful work has been performed in clearing away, after exhaustive search, the reported reefs Beaver and Rambler, the latter a great bugbear to vessels rounding the prominent headland Cape Leeuwin.

In Japan, the south-east coast of Kiusiu has been completed between Odomari Bay and Kayeta Saki; the east coast of Nipon, between the Gulf of Tokio and Ohigasi Saki.

In Corea, large additions have been made to the charts of the southern and western seaboard of this great peninsula. On the former, an examination of that part extending from the Japanese treaty-port of Fusan in the south-east, westward to Herschel Island, a distance of about 90 miles, was made, and some useful harbours and anchorages charted. On the west coast surveying operations were carried out in the more immediate neighbourhood of the capital-town Séoul, in order to determine suitable anchorage for a treaty-port. Jinchuen or Inchön, on the mainland, forming a part of what is known as the Salée river, offered the greatest advantages, and its approaches from seaward, near the labyrinth of islands charted as Prince Imperial Archipelago, were

examined in some preliminary detail; the service embraced a survey of Sir James Hall group.

The survey of Flores Island, English and Archimedes banks, and the extensive shoal ground at the entrance of the river Plate, a measure much required in the interests of navigation, has been nearly completed. In Magellan Strait much useful work has been carried out near the western entrance.

Connected with the transit of Venus in this year, the surveying ship *Fawn* rendered essential service, conveying the observing party from the Cape of Good Hope to St. Augustine Bay in Madagascar, and back, her officers taking part in the observations necessary, as well as making surveys of the coast in the neighbourhood.

To this record of facts and events, which prove beyond doubt or cavil that the study of practical and scientific geography is being prosecuted with an ardour and energy never exceeded in any age of the world, let me venture to express the confident belief that this Society, sustained as it is and has been, by men of varied knowledge and earnest interest in its success, has not in any way degenerated in the three years during which I have been permitted to enjoy the high privilege of presiding over its Council. I cannot speak with gratitude too warm of the cordial support I have received from those eminent men and officials, on whose zealous co-operation in the promotion of its interests the character of the Society mainly depends; and I am very sensible of the efficient support I have ever experienced on all public occasions from the entire body of our Fellows, and of their kindly allowance for my many deficiencies. During all that time, neither at the Council-board, nor in this hall, the scene of our public meetings, has there been the slightest interruption of harmony.

The meetings have been numerously attended, the papers read and the discussions following have often been of the highest interest, sometimes touching on burning questions, as to which much strong and inevitable differences of opinion existed, but on all these occasions the respect for our character as a purely scientific Institution prevailed in preserving the most perfect order, good humour, and mutual consideration.

I had hoped to be succeeded in my high and interesting office by a noble friend, whose high hereditary claims to the respect and confidence of his countrymen, have been fully sustained by his own ability, independence of character, and genuine interest in all that concerns the intellectual advancement of his country. But a jealous Government, which had already robbed us of a Ripon, a Dufferin, and a Northbrook, has repeated its offence by depriving us of the services of Lord Lansdowne at the very threshold of his presidential career, by summoning him to preside over the constitutional government of that great group of colonies, of whose growing prosperity and greatness we are all so proud. For your sake I am heartily sorry. But the post of President of this

Society is one which can never fail to attract men worthy of occupying it, worthy of promoting, with all the talents and energy they possess, the interests of a science which exercises so powerful a fascination over the best minds of our age and country.

OBITUARY FOR THE YEAR 1882-3.

As stated in the Council Report, the losses the Society has sustained by death during the year ending on the 30th of April, were 54. Among the number were many who had gained high distinction as travellers, or for their works on Geography, and in accordance with the custom now established for some years, sketches of the careers of these have appeared at the time of their deaths in our monthly 'Proceedings.' In this way obituary notices have already been given of Mr. Wm. Desborough Cooley; Captain W. J. Gill, R.E.; Mr. Thos. Woodbine Hinchliff; Mr. W. H. Johnson; Admiral Count F. B. Lütke; Sir Woodbine Parish, K.C.H., F.R.S.; Mr. John Petherick; Commander Wyatt Rawson, R.N.; and Mr. J. M. Ziegler. But our losses also include many members who, though not geographers, were eminent in various ways. Their names are here given in alphabetical order:—

Captain L. N. F. Ames-Lyde, J.P.; Mr. Alex. Dunlop Anderson; Mr. George Artingstall; Mr. Charles de la Barre Bodenham, of Rotherwas Park, Herefordshire, who was widely known and respected in the Roman Catholic community, and occupied the post of Deputy-Lieutenant for his county; Mr. John Bowes; the Rev. G. Augustus Bright-Smith; Mr. Richard Brown, C.E.; Sir Edward Manningham Buller, Bart., M.P., who entered Parliament as member for North Staffordshire in 1833, and served that constituency and subsequently that of the borough of Stafford for a long series of years; Mr. Edward Cazalet, of Fairlawn, Kent, who died on the 21st of April, at Constantinople. He had been, before settling in Kent, one of the leading English merchants in St. Petersburg, and of late years became known to the general public for his advocacy of the Euphrates Valley Railway scheme; his views on the question being promulgated in various pamphlets, dealing more with the political than with the geographical aspects of the subject. In 1881, he sent an agent to Constantinople with a view to secure a concession from the Sultan in prospect of a railway uniting the Mediterranean with the Persian Gulf, and in 1882 visited Berlin, where he was presented to the Crown Prince and Princess, before whom he laid his scheme for the construction of the railway. It was while on a visit to Constantinople, made for the purpose of laying his views personally before the Sultan, that he died, last month, from typhoid fever. Mr. John Chevalier Cobbold, Member of Parliament for Ipswich from 1847 to 1868; Mr. Charles Coles; Sir Joseph William Copley, Bart.; Captain L. R. Elliot; Mr. Thomas Falconer; Mr. W. F. Forbes; Mr. Robert Herbert Galsworthy; Colonel J. C. Gawler, Keeper of the Regalia at the Tower of London, an officer who had distinguished himself in foreign service in various countries; his father was the Colonel Gawler, formerly Governor of South Australia, after whom the important town of Gawler, near Adelaide, was named; Mr. T. L. Gooch; Mr. Frederick Solly Gosling; the Right Hon. the Earl of Harrowby, K.G., F.R.S., the eminent statesman, who died on the 20th of November. He had been a Fellow of our Society since 1838 and had served twice on the Council, in 1847 and 1856. Mr. Samuel Heywood; Major T. M. Hitchins, R.A.; Mr. James Huson-More, M.A., a traveller in various countries, who died at the early age of 39. He had resided for a long time at or near Landana, on the Loango coast, and explored the zoology and botany of the neighbourhood. Mr. Hugh Francis Ingram; Mr.

Thomas Jacomb; Mr. Charles Jellicoe; Rev. W. Taylor Jones, M.A.; Lieut.-Col. John Lardner, a veteran of the first Burmese and Crimean wars, who died on the 25th of September, at the age of 76 years; Mr. Daniel MacKinlay; Mr. Philip Melville, F.R.A.S., a distinguished official of the Indian Government, who had held for many years the post of Secretary to the Board of Administration for the affairs of the Punjab; Major-General J. E. Mitchell, of the Royal Artillery, an officer who had served in the wars of the Crimea and the Indian Mutiny, commanding the Artillery at the relief of Azimghur and many other engagements; Mr. Adolph Mosenthal; Admiral Matthew S. Nolloth, who had contributed to the literature of travel by his 'Notes during a Cruise in the Mozambique,' published in 1857; Mr. Edward Hamilton Pringle; Dr. Arthur G. Reid; Mr. John Rutherford; Major H. B. Savory; Mr. Henry Stade, Fleet Surgeon, Royal Navy; Sir John Smale, late Chief Justice of Hong Kong; Mr. William Snooke; Mr. James Lowther Southey; Mr. William Symington; Lord Talbot de Malahide, F.R.S., the eminent antiquarian and President of the Royal Archæological Institute, who died at Funchal, Madeira, last month; Mr. Anthony Trollope, the celebrated novelist, who having attended one of our Evening Meetings (January 14th, 1878), when the subject of the Transvaal was discussed, and spoken on the occasion, joined the Society as a Fellow. His pleasantly written and instructive books on Australia and New Zealand (2 vols., 1873), and on South Africa (1878), entitle him to honourable mention as a traveller and geographer. Mr. Henry Tudor; Mr. Henry Woods; and Mr. Charles Baring Young.

*Report on Russian Geography for the Year.**—From the *Otchòt* (annual report) of the Russian Geographical Society for 1882 we learn with regret the death of Ivan Feodorovitch Kamensky, the pioneer of Russian trade with Central Asia. Partner in the well-known firm of Kamensky Brothers, he at first managed the Siberian branch of their business, establishing himself at Tomsk. Thence he removed to Kuldja, where he had dealings with the Chinese. Entering into a contract to supply their army then about to advance and re-occupy Ili, he displayed excellent powers of organisation in collecting means of transport in a country so deficient in population as Semirétchia. Undaunted by difficulties, Kamensky would have fulfilled his contract had not the policy of the Russian Government suddenly changed. They became as anxious to prevent supplies reaching the Chinese as they had formerly been eager to assist. Thwarted and baffled in his plans, Kamensky found that he had fallen between two stools, for with another turn of affairs the Russian Government decided to press claims brought by the Chinese against the victim of their vacillating policy. Kamensky was completely ruined. Having sent back to Siberia his wife and family, he remained at Kuldja, a kind of state prisoner, waiting the pleasure of his Imperial master, whom he vainly sought to move in his favour. Under these misfortunes his health broke down, and on the 12-24th December last year he ended, at Pishpek in Turkistan, his brief but active career. Kamensky was not only distinguished as an enterprising and active merchant, able to plan schemes and carry them into effect, but as a lover of science and patron of learning. In 1860 he founded, at an expense of 40,000 roubles, wholly defrayed by himself, an agricultural school at Tomsk, of the utmost utility for the class of peasant proprietors for whose wants it was designed. He also assisted in several scientific expeditions. For substantial aid furnished by him to Potanin's expedition to Mongolia in 1879, the Russian Geographical Society awarded him their diploma of honorary corresponding member. His enemies might accuse him of being unpractical and a

* By E. Delmar Morgan, F.R.G.S.

visionary, but nobody ever questioned the strict integrity and nobility of purpose of Ivan Feodorovitch Kamensky.

Of Russian expeditions in 1882 to explore various parts of the empire and adjacent territories, the following are noticed in the report:—Two Polar expeditions, under the command respectively of Lieutenant Jürgens and M. Andréief; astronomical observations in Novaya Zemlya by Fuss; Regel's travels in Pamir; and Lessar's famous journey from Askabad to Merv. In the district of Batum, Petersen has been travelling for scientific purposes, and Katissian has investigated prehistoric remains in the Caucasus. Lastly, in European Russia, Malakhof and Ivanitzky have been exploring the Ural range; Prince Putiatine has worked at the anthropology of the government of Tver; Voltaire has pursued Lettish ethnology in the Government of Vitebsk; Kuznetsof has continued his labours in order to gain a knowledge of the trade in the Western Provinces, and Yelisséief has visited remote parts of Russian Lapland in order to become acquainted with the inhabitants on the littoral of Lake Ehnareh.

The most important of all these undertakings is undoubtedly the establishment of Polar Stations, to which the Imperial Geographical Society has paid special attention.

Of the Russian station at the mouth of the Lena, the most recent news was brought, as already recorded in the 'Proceedings,' by two American officers, Messrs. Schutze and Harber. The party under Lieutenant Jürgens were joined at Yakutsk by MM. Bunge and Eichner. They descended the Lena in three light-draught vessels called *pauzi* and one *karbass* or boat, and were fifty days in accomplishing the voyage to their destination, the island of Sagastyr, which they reached on the 22nd August, having experienced a storm off Tuz-ara, which obliged them to land and repair their boats. All the instruments were saved, and the station was equipped, as already stated, in the most complete manner.

The second Russian expedition proceeded to Malo Karmakulsky Bay, in Novaya Zemlya, viâ Archangel. The place selected for their station was the same in which Lieutenant Tiagin passed the winter of 1879–80, and where buildings had been erected by the Society for Saving Life at Sea. These were placed at the disposal of the observers by this Society. M. Andréief's associates were Midshipman Volodkofsky and Dr. Grunevetzky of the 11th battalion of Turkistan infantry. The weather on their arrival at Novaya Zemlya was unusually warm, the temperature on the evening of their first day there, 4th August, being 66° Fahr., and though it became cooler the following day, yet in spite of a fog the thermometer registered 61°.

Of the other Polar stations some particulars are given. Thus Professor Lemstrem, of the Finland station, undertook to conduct observations in person till November 1882, when he was to be relieved by his assistant. This party of observers, before starting, visited the Pavlofsky * Observatory, and practised the use of instruments. Professor Lemstrem speaks well of the impression produced upon him and his associates by this observatory, of the excellent instruments and able direction distinguishing this institution. Intimately associated with the Polar station on Novaya Zemlya was the journey thither undertaken by Fuss of the Cronstadt Naval Observatory, in order to determine the latitude and longitude of Malo Karmakul. He started from Archangel on the 19th July with Lieutenant Andréief's expedition on

* Pavlofsky is a favourite summer resort of the wealthier classes of St. Petersburg. The observatory referred to in the text was recently established in the grounds of the Grand Duke Constantine's summer palace.

a steamer belonging to the Murmansky Company and reached Novaya Zemlya on the fourth day, having stopped for twelve hours at Kanin Noss (Cape Kanin) to rectify any possible error in the position of this place. His observations were favoured by exceptionally fine weather, and may be considered completely successful. Their results are to alter the latitude of Malo Karmakul 7′, while the longitude remains nearly the same, thus:—

	Fuss's determination.	Plan of Malo Karmakulsky Station.
Latitude	72° 22′ 37″	72° 30′ 10″
	hrs. min. sec.	hrs. min. sec.
Longitude from Greenwich	3 30 50·4	3 30 49·7

Thus the position of the Russian station has been ascertained with sufficient accuracy to meet the objects of the Polar expedition.

The journey of D. N. Anuchin to the Caucasus in co-operation with the Geographical and Archæological Societies of Moscow and St. Petersburg had for its chief object the investigation of the caves of Daghestan in order to discover stone implements. The results of his researches, in the course of which he opened several mounds and visited some places of sacrifice, were of a negative character. He found nothing but beads and other ornaments inducing the belief, which he shared with earlier explorers, that this region was settled by man at a late metal epoch. But the excursions of M. Malakhof in the Ural were more productive. In the district of Irbit, never previously explored, he found on the eastern flank of the Ural a prehistoric cave or "kitchen remains" not far from the town of Irbit. On the rivers Irbit and Rej he found fossil remains of animals, and a cave with hieroglyphic drawings in red on rocks on the left bank of the Irbit near the village of Pisanetz. Previous excavations made here by treasure-seekers had brought to light bones of animals and stone implements.

M. Malakhof also excavated a limestone cave in the valley of the Miass above the works, and found at a depth of 3 to 6 feet, imbedded in clay, bones of bears and deer for the most part split lengthways, and among them stone and bone implements. Everything tended to show that this cave was inhabited in prehistoric times by a people whose weapons were of stone. In the valley of the Miass M. Malakhof also found, near Vorobiovi (Sparrow) Hills, stone edifices, circular and square-shaped, with entrances. They were three feet above the ground and bore a resemblance to those discovered by Potanin in North-West Mongolia, known under the name of *kerreksur*. The Bashkirs have fragmentary traditions concerning them to the effect that they were stations of Khans or Hordes. M. Malakhof also visited the district of Ekaterinburg and made a large collection of schistose implements from the overlying peat on the north-eastern shore of Lake Ayalsky, together with ornamented clay vessels.

Almost simultaneously with these discoveries M. Ivanitzky was engaged upon natural history researches. M. N. A. Ivanitzky is an inhabitant of Vologhda, endowed with excellent powers of observation which he has developed by scientific training. He had formerly made an excursion to Pechora, and wrote an account of his journey entitled 'From Vologhda to Pechora,' which he presented in MS. to the Geographical Society, and which received high commendation.

His preliminary acquaintance with the Pechora region roused in him a desire to acquaint himself more closely with it. Accordingly, last summer he started afresh, expecting to be away a longer time. But the lateness of the season and deep snows interfered with his plans and he was obliged to defer his visit to another year. Instead of proceeding to the far North he went to Perm and so entered the Ural where he botanised diligently, occupying the rest of his time in collecting the

popular songs of the Government of Vologhda. These he has transmitted to the Society.

Lastly, Prince Putiatine has discovered near Lake Bologofsky remains which prove conclusively the existence there of a people of the Stone Age who may be classed among the so-called "hunters of the riverine gravel period." They lived in subterranean dwelling-places, and the climate surrounding them was, judging from their implements, &c., a severe one. They appear to have had no domesticated animals such as dogs or horses.

Russian Surveys in the Trans-Caspian Region and Trans-Caucasia.—During the year 1882 the Caucasian section of the Russian Military Topographical Department executed the following work:—

In the Trans-Caspian region a wide belt of country was surveyed and mapped for a distance of 592 versts, on the scale of two versts to an inch, from Chikishlar by way of Chat to Sarakhs. This will afford a complete basis for the delineation of the frontier line between Russia and Persia. In the vicinity of the Atek astronomical observations were much retarded by thick mists which frequently occur between June and September. Among the astronomical tasks completed during the year are the determination of the longitude of Tiflis and Rostoff on the Don, the extreme point of telegraphic determination in European Russia, a work which joined the telegraphic and astronomical determinations in the Caucasus with those made in Russia proper. The work executed by the Turkistan section of the Military Topographical Department includes a survey from Kungrad to the Gulf of Mertvykulduk. This work was undertaken by Colonel Alexandroff with the object of ascertaining how far the road from Kungrad to the Bay of Yaman-Airakty, on the Caspian, was practicable for wheeled vehicles. From Kungrad to the ascent at the Tchink the water supply is sufficient for travellers, but thence to the wells of Tabyn-su there is a waterless tract for a distance of 135 versts. Beyond that point water is again plentiful. The construction of a landing-stage in the Bay of Yaman-Airakty is quite practicable. Whether it is possible for steamers to enter Mertvykulduk and approach the Bay of Yaman-Airakty, Colonel Alexandroff does not mention. M. Kossiakoff, who was attached to Dr. Regel's scientific expedition to Darwaz and Shignan, left Penjkent on the 4th July (O.S.). At Hissar, Dr. Regel chose the mountainous road to Baljuan, while M. Kossiakoff descended the river Kara-Tag to the town of Kubadian, whence, by way of Kuran-tupe and Kuliab, he reached Kala-i-Khumb. From this point M. Kossiakoff pursued his explorations up the course of the Panj to Fort Wanj and for some distance beyond. Returning to Kala-i-Khumb, he proceeded northwards to Fort Tavildara on the river Waksh (Hullias) and up that stream to Kurgan Lajur. After having explored the upper course of the Ak-su (Doaba Dara of Indian Survey Report) river, M. Kossiakoff and Dr. Regel entertained the hope of being able to explore Shignan, but owing to the long delay in obtaining the necessary permission from the king of Shignan the scheme was abandoned, and Kossiakoff falling ill, was compelled to hasten his return to Samarkand. Proceeding from Kala-i-Khumb to Talvar (? Tavildara) down the river Ak-su to Fort Sarypul, and further to Baljuan, Dushambe, Dehnau, and Baisun, M. Kossiakoff continued his survey to Yar-tupe, where, in consequence of the state of his health, he was compelled to abandon the work and proceed to Samarkand. His route-survey extends over about 1400 versts of ground. A good deal of this survey covers the western part of the work done by M—— S——, General Walker's native explorer, and the two combined will be found to throw much new light on the geography of Badakhshan.

Journey in the District West of Cape Delgado Bay, Sept. Oct. 1882.

By H. E. O'Neill, H.M. Consul, Mozambique.

Map, p. 440.*

In August last I was informed by a high Portuguese authority at Mozambique that there were good reasons to suspect a trade in slaves from Tunghi Bay, south of Cape Delgado. Having some time previous to this gained the permission of the Foreign Office to visit the northern ports of the province of Mozambique, I determined to use the opportunity this journey would afford me, to make an examination of the districts bordering that bay, in order to discover, as far as possible, the foundation for the suspicions mentioned to me; feeling sure that I should be excused an extension of my journey, if by it I could add in any way to our knowledge of the working of the slave trade, and thereby aid, in however small a degree, the efforts of both Portuguese and British Governments in its suppression.

Another incentive to the prosecution of this journey was the prospect it promised of a peep into the country occupied by that strangely isolated tribe the Mavia or Mabiha. This tribe, whose existence was first pointed out by Livingstone, has baffled the efforts of succeeding travellers to penetrate their country. Of it Mr. Joseph Thomson writes :—"They are noted as the most exclusive tribe in East Africa, as even the Arabs have as yet been unable to penetrate beyond the outskirts of their country." And Mr. Chauncy Maples, foiled in his attempt to pass through their country, tells us :—"We had hoped to strike through the Mavia country to the river Msalu and thence to Medo, for which we were bound. This, however, we found impossible. No road existed there, we were told. Besides, the Mavia are said to be so fierce and inhospitable to all other tribes that no one dares to pass through their country." To read all this was very whetting, and could not but excite a desire to break down the barriers by which the tribe seemed to be fenced in, and to learn something of their nature and customs, as well as of the reasons of the strange exclusiveness reported. This I determined to strive my best to do.

My starting-point for the interior was not less than 250 miles north of Mozambique, and it seemed doubtful at first if I should be able to reach it, as the season was late and the north-east monsoon was fast setting in. But a sudden change of the wind to the south-west favoured me, and on the 9th September last I left Mozambique in a sailing *lancha*, or small schooner, and pushed out, contrary to custom, into

* See also map in 'Proceedings,' 1882, p. 128.—We avail ourselves of this opportunity of correcting an error which has crept into our reproduction of the former map of Mr. O'Neill in 'Proceedings,' 1882, p. 648 : the range of "craggy granite peaks" there represented in the interior near Almeida Bay should be 2–3000 feet high, not 2–6000 feet.—[Ed.]

the Madagascar Channel, in order to escape the strong southerly current that almost invariably sets upon this portion of the African coast. Nearing the land again on the 11th, I found myself in the neighbourhood of Ibo, just sighting its flagstaff and lighthouse, conspicuously raised above the groves of coco-nut palms which almost cover the face of this island. Thence—as I could not afford to lose, by any delay at this point, a favourable southerly wind—I stood steadily on to the northward, continuing to run before a strong breeze and heavy sea, which, though favourable, made our little craft a great deal too frisky to be comfortable. At sunset we made the Tambuzi pass, and after narrowly escaping shipwreck upon the reef which runs out from the island a considerable distance to the southward, anchored under lee of its western extremity, heartily glad to exchange the rough sea and discomfort of the Mozambique Channel for quiet waters and a night's rest in Masimbwa Bay.

The next day was occupied in threading our way between the numerous shoals and rocky patches which at this point connect the mainland with the outlying Querimba Islands, and it was late in the evening before the last channel was passed, and Tunghi, in the Bay of Cape Delgado, reached.

My object in calling here was to obtain guides to conduct me a certain distance upon the road that, leaving the coast at Menangene, connects with the well-known Kilwa-Nyassa road at some point upon the Lujenda, a little above its confluence with the Rovuma. A journey upon this road, stemming the current of caravans, great and small, passing at this season to the coast, would, I felt sure, best give me that information respecting the slave trade that I sought. Two guides, after some difficulty, were obtained, who agreed to accompany me to Lake Nangadi, our future course to be decided upon arrival there.

I accordingly ran my little craft aground upon a sheltered bank off the village of Menangene, and, leaving two hands in charge, landed with the rest of my men, who had been engaged to act indifferently as carriers or crew, as circumstances required.

I shall pass over the incidents of our necessary delay before departure from the coast, and will just say, with respect to this little settlement of Menangene, that it appears to be quickly rising in importance, and, commercially speaking, may even now be said to be the chief point in Cape Delgado Bay. Better situated for intercourse with the interior than Tunghi, it possesses an equally good harbour, has higher ground in its vicinity, and is reported healthier. These advantages, combined with the liberal commercial policy of the Sultan of Zanzibar, are attracting to it the trade of the neighbouring district, and caravans from the interior to this part of the coast generally make it their first point of call. With respect to the nature of the trade, this consists now chiefly of indiarubber, gum-copal, and ivory. Trade in slaves there no doubt has

been, and to a certain extent is; but it is a favourable sign that the number of Arabs trading in the place has of late decreased, and that Battias and Banyans are commencing to establish themselves in it.

The eighth day after leaving Mozambique saw us on our way into the interior, travelling upon the road that leads from this point to the Nyassa. As this portion has been lately passed over by Mr. Thomson, who has read a paper upon his journey before this Society, I will say but little of it. There is, indeed, but little to be said, for the country is of a most barren and uninteresting character. Poorly wooded, and of a sandy soil, it rises almost imperceptibly from the coast to a height of 474 feet at Chimsaka's. Its drainage appears to be carried out by a number of sponges, or swampy depressions, many of which form in the rainy season large shallow ponds, or rather small lakes of several miles in circumference. Some of these, even when I passed them in September, were fairly full, and were prettily dotted over with islands, whose green formed a refreshing relief to the tame and withered aspect of the country.

Three days at Chimsaka's enabled me to take lunars, which gave satisfactory results, placing the village of this chief in long. 40° 6′ 22″ E., or a little west of the position given it by the dead reckoning of Mr. Thomson. In changing the name of their chief to Chimsaka from "Kwachimsaka," I have but struck off the Swahili preposition *kwa* "to" ("we are going to Chimsaka," "tunakwenda kwa Chimsaka"), and reverted to the orthography of Livingstone; for I discovered that this chief was none other than the "Chimsaka" visited by Livingstone in 1866, and laid down in the Royal Geographical Society's large-scale map as close to Mtarika's of that date.

Conversing with him respecting the locality he had left, I asked him to draw for me on the ground some of the rivers and mountains of his former country. Willingly assenting, he roughly, but not inaccurately, sketched out the Lujenda and Rovuma, placing his former village near the latter, but some distance above its confluence with the Lujenda, and laying down the villages of the neighbouring chiefs Mtarika, Chingawala, and Mtende, almost exactly as they were laid down by Livingstone. I then asked him if he remembered a white man passing his way nearly twenty years ago. "Oh, very well, a long time ago; he passed with a donkey"—"E waa, zamani, amechukua punda"—was his immediate reply. He further told me that he and Mtarika had been driven from that locality by a Mangoni raid, and that whilst Mtarika had turned south, he had turned north, and, crossing the Rovuma, had lived some time in the neighbourhood of Masasi before taking up his residence upon his present ground.

On leaving Chimsaka's I struck off the main road to the northward, and, passing several Makua villages, camped at one named Mkalani. About noon upon the second day the country began to change in cha-

racter, and we entered a rough, broken sandstone ridge, leaving behind us the monotonous levels I have before mentioned.

Crossing this we suddenly opened up, from a small gorge, a scene of great picturesque beauty. About a thousand feet below us lay the broad Rovuma valley, down to which the hills, from which we viewed it, fell in sharp descent. Through its centre the river ran, fringed with broad banks, in this the dry season, of the whitest sand, into which, in the distance, the waters imperceptibly merged, and the dividing line being lost to the eye, a greatly exaggerated impression was gained of the river's breadth. Several islands of various size and irregular shape, and covered with the purest green, were dotted upon its surface. For many miles on either side, and extending to the feet of the flanking hills, was a marshy rush- and grass-grown bed, intersected here and there by streams and rivulets, which ran from the neighbouring hills, glistening brightly under the noonday sun, forming the favourite haunts of the hippopotami and crocodiles with which these swamps abound. Carrying the eye westward, and beyond the point where the hills fell away north and south, a vast plain was visible, upon which had settled a heavy lurid haze, the smoke of innumerable fires undispersed in the still midday air, and touched up and brightened by the beams of a fiery sun. Across the valley, and about 10 to 15 miles distant, the Makonde hills arose, apparently as abruptly as those on which we stood, and gave a deep bold framework to the picture.

Our path ran for some little distance along the edge of the Mavia plateau, the northern escarpment of which is, at this point, sharply precipitous. Turning a little to the southward we lost sight of the Rovuma valley, and, after a hard day's march, arrived at sunset upon the eastern bank of the Lake Nangadi, on the outskirts of the village of a Makua chief called Mlaba.

I have noticed that Mr. Thomson, in his paper, has made no mention of this lake, which turns slightly to the N.N.E. at its northern end, and is therefore only partly visible at the point from which he viewed it. I have made a sketch plan of the lake, taken from a hill about the centre of its eastern shore, from which its whole extent was visible. Upon three sides it is inclosed by low hills that vary from 200 to 400 feet in height, whilst the fourth, or northern, is open to the Rovuma valley.

It cannot in any sense be called an upland lake, as its altitude is only 57 feet above the level of the sea (boiling-point thermometer), and probably its level is about the same as that of the river at this point. It only communicates, however, with the Rovuma during the rainy season, when it overflows into the Mtumbwi river, by which its waters are carried into the main stream. From my point of observation I could distinctly see that the marshy level adjacent to the river extended to the northern extremity of the lake, and at first it appeared

to me probable that the lake was but a backwater of the Rovuma, receiving its waters from it during the rains. But this supposition was not borne out by inquiry, and I was informed that it was only connected by means of an outlet during the wet season. It is well stocked with fish, and many parties of Mavia come down from their hills to catch and salt that luxury, living meanwhile in *vihanda*, or temporarily erected huts, upon its shore.

I regret that three photographic views I took of this lake were entirely spoilt by a careless exposure, on the part of a servant, of the plates to light before development.

On my arrival at Nangadi I had received a disagreeable and painful rumour of the destruction of our Universities' Mission Station at Masasi by the Makangwara, and the flight for life—as I was first informed—of our missionaries to the mountains of Kwamatola. Not knowing at first how much of this to believe, and unable to proceed until I had discovered the truth, I at once despatched a messenger to Newala with a letter to be delivered to Mr. Maples, and I decided after four days' delay to push on one stage further to the banks of the river marked on our maps as the Lidedi, and to await an answer there.

I was quickened to this decision by the arrival at Tchipili, on the third day of my stay, of a Yao slave and ivory caravan, numbering in all about 400 souls, nearly half of whom were slaves. The sustenance of so large a party caused a comparative dearth in the district, as all the neighbouring villages were being scoured for food, for which the highest prices were being paid. This was inconvenient, as my style of travelling was severely economical, and a change to a land of greater plenty became desirable.

I should not omit to say here that this caravan was not originally intended for the Mozambique coast. Kilwa-Kivunji in Zanzibar territory was its first destination; but hearing of the Makangwara raid, and fearing to encounter that warlike tribe, who would certainly have swooped down upon them had they heard of their proximity, they turned aside to the coast south of the Rovuma. The answer to my letter arrived in due time, and I was very delighted to learn from it that the reports I had received were much exaggerated. I was assured by Mr. Maples that, although they had been robbed of almost all they possessed, there had been no loss of life amongst the members or natives of the mission, nor did he anticipate any further danger. This freedom he attributed to the superstitious character of the Makangwara, who hold the whites in great dread. It had been far otherwise with the Makua and Yao villages in their vicinity, which had been all totally destroyed, and their inhabitants murdered or led into slavery.

This Makangwara tribe and the Maviti are the curse of this portion of East Africa, and the great bar to its peace and progress. Whole districts depopulated; entire tribes cut up and dispersed; vast areas of

country devastated; in short, murder, famine, and slavery are the direct results of their predatory habits. The peaceful influence of our missionaries on the Nyassa seems to have done something towards checking the warlike instincts of the latter; but the Makangwara are as yet untouched by them. It is almost fortunate that these two tribes are hereditary enemies, as this enmity in certain degree tends to paralyse the harmful power of each.

My pushing on to Lidedi was fortunate, in that it enables me to point out the existence of another lake, similar to and only a little smaller than Nangadi, called by the natives Lidedi. The river that flows into this lake, upon which Natiaka, passed by both Messrs. Thomson and Maples, is situated, is the Mlenji, and the name Lidedi is only given by the natives to the lake, and perhaps to the river connecting it with the Rovuma. From Natiaka's the lake is about $1\frac{1}{2}$ mile distant north (true), but as the intervening country is hilly and broken, you only get a glimpse of a small portion of its surface between the hills, which gives no impression of the existence of a lake. I walked, however, to and for some distance along its eastern shore, and found it a sheet of water, comparatively speaking, of considerable size, and quite deserving the name of a lake. It is of triangular shape, of from $2\frac{1}{2}$ to three miles in length, with an extreme breadth of not less than one mile.

I was assured, both at Natiaka and upon the lake itself, that it receives its waters from the Rovuma, and that the river connecting its north-west extremity with that river flowed—and at this season it was said to be not quite dry—*into* the lake; whereas that which connected its north-east extremity flowed *out* of the lake into the river.

I am sorry I was unable to fix the level of this lake; but, owing to the desertion of some of my porters, I had been compelled to leave several loads at Nangadi, and amongst them had been forgotten my thermometers and apparatus for boiling. I could, however, clearly see that the northern shore of the lake consisted of the same marshy, level land adjacent to the banks of the Rovuma, which was also clearly visible to the eye at an apparent distance of five or six miles.

Reassured by the receipt of Mr. Maples' letter, I was now free to carry out the next step in my programme, viz. to turn southwards, and penetrate at least the confines of the Mavia country. I remained four days at Natiaka's, struggling hard to obtain some one who would take me off this, the well-beaten caravan road, and guide me direct to the southward. But I met with all the opposition here that Mr. Maples encountered when endeavouring to force his way in the same direction. "There was no road; nobody ever went into the Mavia country from this point; they would not admit strangers," &c. "Why not?" I asked, "if we did them no harm why should they harm us?" "Oh, they were thoroughly wild (*washenzi kabisa*) and treated all strangers as enemies."

Such were the answers I received, and had I not been favoured by an accident I should have been condemned to return by the same road by which I had come, or by that traversed by Mr. Thomson last year on his return to the coast. This accident was the appearance at Natiaka, on the last day of my stay, of a Mavia chief with whom he was on friendly terms, named Lishehe, whom curiosity had led to have a glimpse of the white he had heard was staying with his friend.

Here was my opportunity, and after a long palaver, accompanied by a judicious increase in my present to Natiaka, which served the double purpose of enlisting his arguments in my favour and exciting the cupidity of his friend, we succeeded in convincing the latter that our objects were innocent and harmless, and gained the necessary permission to visit him at his village, to which he promised to personally guide us. Thence, it was arranged, we were to go on to Mkopoka's, another Mavia chief of some influence.

To pick up the things I had left at Nangadi, we returned to that lake and camped that day on the left bank of the Mwidi river. The next morning we were aroused at the unconscionable hour of 1 A.M. by our Mavia guide who desired us to start without delay. His suspicions, it was evident, were but half allayed, his object in wishing us to travel by night being to prevent our preserving any recollection of the path we traversed. Feeling it best to humour him, I at once struck camp, notwithstanding much grumbling on the part of my men, and for about two hours we made a sharp ascent, our path leading southerly.

The height of the Mavia hills at this point I estimate at 1200 feet, for shortly after reaching the summit we commenced a very gradual descent until the village of Lishehe was reached, which village I found, by aneroid and boiling-point thermometers, to be at an altitude of 974 feet.

Travelling by what I am sure was a very circuitous path, we entered the village of our guide in the forenoon of that day. A description of one of these Mavia villages will serve for all. A circular belt of about 60 or 80 feet in width was thickly planted with trees and thorny underbush, every crevice in which appeared to be filled up so carefully that it became an utter impossibility for man, or beast of any size, to penetrate it. At two or three points a narrow path was left for entrance and exit, which is strongly guarded by double or treble gates. I use the word gates; but of course they are innocent of lock or hinge. There is a framework of two strong uprights, deeply imbedded in the ground, and strengthened by two horizontal bars about five feet apart. Two other movable horizontal bars fit, one end in a hole, the other in a niche in the uprights. A number of smaller uprights have holes burnt through both their ends, by which they are threaded upon the two horizontal bars, until the framework is completely closed, when the ends are thrust into the holes and niches, and the whole strengthened by beams placed against it upon the inside. During my stay at Lishehe every gate was carefully closed at sunset.

The inclosure at Lishehe was of considerable size, and admitted of the building of 40 or 50 huts without crowding; and though space was unavoidably valuable, I noticed that care was taken to spare all shade-giving trees, which pleasantly varied the interior surface, otherwise level and bare of the smallest blade of grass. Goats in great abundance, and cocks and hens, took the place here of the Irishman's pig, and lived in happy union with humankind, forming apparently a very thriving family. It being inconvenient to enlarge an inclosure, when the packing of this heterogeneous family becomes insupportably close, another inclosure is planted out within a short distance, to which the superfluous population betakes itself. A fresh inclosure was in course of construction close to Lishehe at the time of my visit.

I had hoped to discover, and to be able to relate, some curious customs special to this tribe, which has earned for itself such a name for exclusiveness and idiosyncrasy. But, except it be that the dearth of water in their country, and personal propinquity of their mode of life, make them especially dirty, and impart to their inclosures an aroma that I have never experienced outside the monkey-house of the Zoological Gardens, I can fix upon nothing to distinguish them from neighbouring African tribes. Saving, of course, the one peculiarity already pointed out by Mr. Thomson, that the men as well as the women wear the *ndona*, or *pelele*, or lip-ring.

This fashion exceeds, I think, any attempt ever made by man or woman-kind—and they have been many at various stages of the world's history—to distort and vilify the work of nature. Ingenious as the votaries of fashion are in this direction, it would tax their ingenuity to produce anything more strikingly hideous. In pure and unalloyed ugliness, it crowns the chignon, beats the modern bustle, and throws even crinoline into the shade. A long absence from England prevents me speaking of any later abomination; but Du Maurier's sketches leave one in doubt as to what æstheticism may not have done.

I tried hard, by means of bribes and promises of further payment, to persuade an elderly couple, whose lips had been enormously distended, as age and constant use permitted the entry of a larger disc, to stand facing each other, so that I might reproduce with the camera their extraordinary profiles; but it was of no avail. The popping of my head and shoulders into the black velvet had apparently the same effect upon them that the putting on of the black cap may be supposed to have upon the mind of a condemned prisoner in an English court of law, and with a quick look of horror at the supposed sorcerer, or at what they imagined was left of him, they incontinently bolted.

By means of the *ndona* the women give a shrill, quavering whistle—striking the tongue rapidly against its under surface—used by them to call the men in time of danger, or when anything extraordinary has occurred. On my arrival at Mkopoka, I came rather suddenly upon

some outlying huts, at which there were only some women sitting. Startled by our appearance, they set up this cry or whistle. In a moment it was caught up in a dozen different directions, and before five minutes had passed we were surrounded by more than 100 people, many of them women and children, for they were quickly reassured, and no real alarm was felt.

In justice to what I saw of the Mavia—and I passed ten days in their country—let me say this ugliness does not extend beneath the surface. I found them anything but "fierce, treacherous, and inhospitable." When once their natural suspicions—begotten, I feel sure, of many decades of ill-treatment by surrounding and more powerful tribes—were allayed, and confidence established, they were hospitable and generous, and showed neither distrust nor reserve. Indeed, they seemed to me to be a particularly simple-minded, harmless folk. Very different in this respect to the Yao, by whom, incited doubtless frequently by coast traders, they have been regularly hunted and harassed.

Their isolation and exclusiveness I believe to be simply due to the fact that they have been the "game" of adjoining and better armed tribes and coast dealers. I heard that our friend Chimsaka had been one of the worst of these, but that latterly he had listened to better counsels.

The weather during our stay at Lishehe was unfavourable for the taking of lunars, and I was unable to fix the longitude of the village of this influential Mavia chief. By meridian altitudes of stars north and south, I place it in lat. 11° 9′ 21″ S.

Instead of penetrating still further south, I was disappointed to see that our course to Mkopoka led us again coastwards in almost a due easterly direction. Although a pure Mavia, and the recognised head of a number of Mavia villages, it was easy for me to see that this chief was one of those living upon the confines of Mavia territory whose tribal reserve is fast disappearing before the influences of trade. Unfortunately these influences are not always beneficial. I found Mkopoka just one of those whom the coast native traders like to find at the head of affairs, whom they can use as a puppet to serve their own ends. Weak-minded and fond of drink, he seemed entirely in the hands of a number of these, who had established themselves at his village. Led by them, it appears that he had been guilty of kidnapping some of his own tribe, and selling them into slavery. By his own people he was evidently beginning to be considered a renegade, and during my stay at his village women were taking flight coastwards, as it was rumoured that war was to be made upon him, in revenge for his conduct, by several of the Mavia chiefs.

It was simply owing to this condition of things that I failed to get further inland from this point. "There was war," and "there had already been fighting," and no one would venture to guide me in that

direction. I was four days striving against these excuses, not knowing at first how far they were real, but at last had to succumb, convinced of their truth. I had no alternative, therefore, but to make my way to the coast, and I struck again E.N.E., coming upon the old caravan-road at Chimsaka's, where I arrived on Oct. 8th.

Before entirely leaving the Mavia, I will just say that they appear to me to be a branch of the Makonde. In many points their customs are similar, and the women have all the independence of position, and freedom of selection in marriage, that the Makonde are said to have. They are frequently spoken of also as such by the coast people, who often use the terms Makonde and Mavia indifferently in talking of them. Whether the small collection I was able to make of Mavia words bears out this supposition, I cannot say, for I do not possess a Makonde vocabulary with which to compare it, nor do I know if one has yet been published. They show a great respect for their dead, and carefully tend the graves of any of their chiefs or head-men. I saw several of these, on which was a raised mound, neatly shaped, of clay, inclosed within a low ridge, similar to the border stone of a Christian grave. This again had a raised framework upon it, roofed in with thatch, and the corner posts were generally ornamented with small streamers of cloth.

Nothing worthy of remark occurred on my return journey to the coast, which was reached at Menangene on Oct. 13th, after an absence of four weeks.

Guides paid and dismissed, we hauled our little *lancha* off the bank on which she had been securely shored up for a month, and embarked without further delay, making sail for Ibo. Three days' pleasant run before a brisk north-east monsoon, within the Querimba Islands and reefs, brought us to that port. There are very interesting stone ruins upon many of these islands, traces of former Portuguese occupation, in the remains of forts, private houses, and religious establishments, the latter, we are told, the work of the Jesuits. These, however, were all wrecked in the beginning of this century by an extraordinary invasion of that daring seafaring tribe of Madagascar, the Sakalavas, who, after sacking the Comoros, sailed over to the African coast, and overran a number of the Querimba Islands, capturing and murdering their inhabitants, and leaving nothing but ruin in their train. Since then, with the exception of Ibo and one or two of the adjoining islands, they have been practically uninhabited.

The little settlement of Ibo needs no description here. Considerable improvements have been made within the past three or four years by the Board of Public Works of the province, which has erected a new custom-house, post-office, governor's residence, and lighthouse. As the number of ships entering this port in one year may generally be counted on the fingers of one hand, almost the whole trade being carried on by coasters who invariably anchor at night, the practical utility of the expenditure upon the latter work may be open to question.

Nothing strikes a stranger more than the sleepy air that pervades this and such-like out-of-the-way settlements of the coast, where neither mail-steamers nor other shipping call. Its governor, a most courteous and hospitable gentleman, Major R. Palma Velho, of the Portuguese cavalry, presides over the whole coast from Cape Delgado Bay to the Lurio river; but as no practical jurisdiction is exercised beyond the vicinity of Ibo, the duties of administration are not, I imagine, very burdensome.

After passing two days here, I left for Mozambique, calling at Simooku and Mwendazi. Whilst at the latter place, I sailed to the entrance of the Mkubure river, in order to correct an error that has arisen regarding the point of its entry into this bay. Its mouth is placed in the Royal Geographical Society's recently published large-scale map in the south-west corner of Memba, or Mwendazi Bay, and it occupies there the place that should be taken by a short salt-water inlet, named Marazani. The Mkubure is really the river marked in the Admiralty charts of Owen's survey as the Tembo river.

In a map accompanying a report to the Foreign Office of a journey upon the coast, dated July 3rd, 1880, this was correctly laid down, as subsequent examination has proved.

I think Consul Elton, in his land journey, must have passed round the head of the inlet Marazani, seeing nothing of it, and, coming first upon the Mkubure, erroneously connected it with that inlet, and made it flow into the south-west corner of Mwendazi Bay. The two rivers Mwendazi and Mtumbu—not Mkubwa—are again to the eastward of the Mkubure. They are both independent streams, and form no part of the delta of the Mkubure, as I confess I once thought. The Mkubure has but two mouths, close to each other, formed by a small island at the entrance of the river.

Leaving Mwendazi on Oct. 25th, I made a quick run to Mozambique, arriving the same day, after an absence of seven weeks, in which about 800 miles had been traversed by land and sea.

I cannot claim for this journey any very important results. No great extent of new country has been traversed in it. But I think I may justly say that it has done something towards increasing our knowledge of the limited area passed over, in that I have been able to throw some light upon the hitherto unknown Mavia tribe; to point out the existence of another, though small, lake in the valley of the Rovuma, and to astronomically fix certain positions only laid down in our maps by dead-reckoning. These, I trust, will be sufficient to commend it to the appreciation of the Council of the Royal Geographical Society.

English.	Mavia.	English.	Mavia.
Man (adult)	Noonoo	An old woman	Nihikulu
An old man	Humu	Head	Mutwe
Boy	Mwachi	Arm	Mkono (Swahili)
Girl	Nahaku	Leg	Lidodo
Woman (adult) ..	Bangala	Finger	Biala

English.	Mavia.
Stomach	Kitumbo
Hair (of head)	Wimbo
Eyes	Meho
Nose	Mula
Mouth	Kanyua
Teeth	Mero (Swahili)
Foot	Mikambato
Ear	Matu
Breasts	Mavele
Beard	Chireu
Nail	Dignombe
Lion	Himba
Tiger	Chui (Swahili)
Goat	Mbudi
Cat	Maka
Rat	Gingondo
Deer	Punju
Food	Bilyu
Cassava	Mōgo
Indian corn	Dimuri
"Kitoweo," something to be eaten with rice or cassava to flavour it	Mehemba
Fish	Homba
House	Ngande
Door	Nangwa
Bedstead	Chinanda
Mat	Kikandi
Gun	Yuti
Axe	Mbedo
Axe, small, like a tomahawk	Mundu
Chair, or small stool	Kitenu
Cloth	Enguo
Cap	Kijulu
Lip-ring	Ndona
Ear-ring	Nyolo
Fire	Moto (Swahili)
Water	Medi
Rain	Mbula
Clouds	Nungu
River	Muto
Sun	Lidula
Moon	Mwedo
Star	Ginondi
A small hill	Lichinga
A large hill	Litumbi
Stone	Mawia
Tree	Ntera
Grass, or leaves	Gwahi
Hunger	Ndoba
Thirst	Nyota

English.	Mavia.
Sickness	Kuvula
Wealth, property	Wenga
Town	Nkaya
Island	Litanda
Sea	Kumanga
Danger	Kijoha
Peace, calm	Kididima
War	Vita (Swahili)
Ivory	Liwenwa
A stick	Ingnogo
Water jar	Chilongo
Cooking vessel	Chikarero
God	Nungu
The devil (an evil, hurtful spirit)	Mohoka
To make	ku madengo
„ eat	kulya
„ walk	ku haveha
„ go	ku hena
„ fall	ku uwa
„ stand up	ku takaluka
„ sit down	ku kikala
„ speak	ku tangola
„ beat	ku tarega
„ fight	ku patana
„ steal	ku iwà
„ beg	ku jua
„ consent	ku pochorera
„ refuse	ku kitamwa
„ carry	ku nyakula
„ cross a river	ku lovoka
„ kill	ku lia
„ marry (of the male)	ku lomba
„ marry (of the female)	ku twangu
„ give birth	ku veleka
„ have a festive gathering (ku piga ngoma)	ku omba
„ build	ku denga
„ tear	ku papuka
„ help	ku konghodi
„ seize	ku kamula
„ cut	ku chera
„ bind	ku hungu
„ see, look	ku lola
„ break	ku tema
„ know	ku maiya
„ accompany	ku nandola
„ search for	ku nambera
Beautiful, or good	kwahalala
Ugly, or bad	okobanga
Strong	dimongo
Weak	ulemwa

GEOGRAPHICAL NOTES.

Mr. Thomson's Expedition to Victoria Nyanza.—We draw attention to the telegram at p. 410 of this number, received a few days ago, respecting the movements of Mr. Thomson. It will be seen that having reached, by a previously unexplored route, the north-western foot of Kilimanjaro, he has been compelled to retreat to his former camp at Tavéta, south-east of the mountain. We hope soon to receive the promised letter, with the needed particulars of the occurrence.

Exploration of the Central African Lake Region.—The African Lakes Company have commissioned Mr. Henry Drummond to visit Lakes Nyassa and Tanganyika, and report on the geology and botany of the basins of these great inland waters. Mr. Drummond is well qualified by his previous studies for this important work. He left England *en route* for Aden last week, and will reach Nyassa viâ Quillimane and the Zambesi and Shiré rivers.

The Portuguese Expedition to Umzeila's Country.—The Portuguese expedition which we announced in the January number of the 'Proceedings' * as having left Mozambique in September last for the headquarters of the chief Umzeila, has returned to the coast. The route followed by Lieut. Cardoso and Dr. Franco was from Inhambane N.N.W. to the Sabi river and thence W.N.W. to Umzeila's kraal. Partly owing to the unsatisfactory nature of the reception met with and partly to the lateness of the season, they abandoned the intended continuation of their journey to the Zambesi and Shiré, and returned to Sofala and thence by a coast road to Inhambane. It is said that the two officers have reported unfavourably both of the country and the people. They saw no traces of mineral wealth, the little gold that is brought down to Sofala coming from the neighbourhood of the Buzi further north. Neither is the country rich in agricultural products; it is ill-watered, and cultivation exists only on the very smallest scale; the people, too, are ground down to the lowest depths of poverty and misery by the tyranny and rapacity of the chiefs, the chief delinquent in this respect being Umzeila himself.

Geography in East Siberia.—We have just received five numbers of the 'Transactions' (*Isvestija*) of the East Siberian section of the Russian Geographical Society, which has its seat at Irkutsk. They contain the published work of the Siberian geographers for 1881 and part of 1882. The following are the titles of the principal articles, which will be seen to have considerable interest:—The five parts for 1881 contain: 1. Notes on the Communal Life of the Trans-Baikalian Cossacks of the 3rd Infantry Division, by M. Vagin. 2. Tables of the Opening and Closing of the Rivers of Eastern Siberia, by N. N. Agapitof. 3. Preliminary

* January 1883, p. 33.

Report on the Geological Exploration of the Littoral of Lake Baikal for 1880, by J. D. Chersky. 4. Askold Island, by M. Yankofsky. 5. Kitchen-middings and Stone Implements from the Shores of Amursky Gulf, by the same author. 6. Analysis of Coal, by M. Shamarin. 7. Caves along the Biriussa, by M. Bogolyubsky. 8. Antiquities near Baikal Lake, by N. N. Agapitof. 9. Traces of the Stone Age in the Basins of the Kuda and Unga rivers, by the same author. 10. Some additions to Ritter's Asia, by J. D. Chersky. 11. Same author, On the Question of Ancient Glaciers in Eastern Siberia. The last part contains a sketch of the Russian Polar Station on the island of Sagastyr at the estuary of the Lena, and further particulars of Lieutenant Jürgens' party, from a letter to His Excellency the Governor-General, dated Yakutsk, December 16th, 1882. Mention is made in it of the report brought back by the American officers confirming what has already appeared in the 'Proceedings.' It is further stated that intense cold unaccompanied by snow prevailed, that the reindeer moss had been frozen, the rivers and lakes coated with unusually thick ice, and that little water remained for the fish. The earth was cracked into wide fissures by the severity of the cold. All this promised badly for the future. At Yakutsk the roofs of the houses were quite bare of snow, and they were expecting an inundation in spring owing to the pressure of ice floes, and its invariable accompaniment, epidemic disease. Though Jürgens did not mention it in his letters, in order not to cause alarm, it appears that one of his associates, Bunge, had sustained an injury during their voyage from a fall off the roof of their vessel while asleep. He had, however, recovered, and was curing numbers of natives who applied for medical assistance. The Tungusus were two miles from their station, and showed a most favourable disposition towards them, in return for assistance given.

Trade with Siberia viâ the North Cape.—It is stated that the steamer *Louise*, belonging to Baron Knoop, will this year, for the last time, attempt the voyage to and from Siberia, sailing in the beginning of July. M. Sibiriakoff will also, in spite of his previous costly failures, make an energetic attempt in the course of the summer to establish a regular trade with the Siberian rivers, by sending no fewer than three separate expeditions. His steamer *Nordenskiöld*, which failed to reach Novaya Zemlya last year, will attempt to reach the Yenisei, there to take in a cargo which has already been brought to Sastorovski, returning to Europe before the winter sets in. Within the last few days also the two captains have arrived at Gothenburg who will take charge of the steamers which are being equipped there by M. Sibiriakoff's agent, M. Appelberg. The Russian captain Weide will command the newly built steamer *Obi*, which is to leave Gothenburg with the *Nordenskiöld* about the beginning of next month. The *Obi* will take sixteen months' provisions, and is intended to run cargoes between the town of Yenisei and

the depôt at Sastorovski, besides keeping up communication with the European ships. The third steamer will be commanded by Captain Grönbäck, who will select a suitable spot either in Yugor Strait or the southern part of Novaya Zemlya for the erection of a large warehouse, where goods which in bad ice years cannot be sent across the Kara Sea may be kept till the winter, when they will be transported overland by Samoyedes to Obdorsk. Captain Grönbäck will winter either at Khabarova or in its vicinity. A Norwegian ship will also sail from Tromsö with building materials for the warehouse, but she will obtain her equipment from Gothenburg, as this place has hitherto been the starting-point for all M. Sibiriakoff's Siberian expeditions, which have already cost him a million crowns, or about 56,000*l*. M. Sibiriakoff has given orders to the captains through M. Appelberg to use every effort to render assistance to the *Dijmphna* and *Varna*, if it appears to be required.

Sir Francis Drake, and the Falcon of Gold.—In the historical work on Costa Rica, Nicaragua, and Panama, about to be published at Madrid by Don Manuel M. de Peralta, there are some inedited documents relating to Sir Francis Drake. Among them there is a letter from Don Francisco de Zarate, the owner of a ship captured by Drake, to Don Martin Enriquez the Viceroy of Mexico, dated Realejo, April 16th, 1579. In the narratives of Drake's voyage round the world it is related that, when this ship was captured on April 4th, 1579, the owner was on board, and that Drake took from him "a falcon of gold with a great emerauld in the breast thereof." It has hitherto been assumed that this was an act of pillage on the part of Drake, and Sir John Barrow, in his Life of Drake, p. 57, says—"but whether by seizure, by purchase, or as a present, is not mentioned." After three centuries this letter from the owner clears up the doubt. He says, "He (Drake) treated me courteously, and having taken a fancy to some ornaments of mine, he sent them on board his ship, and gave me for them a cutlass and a silver chafing dish. I promise your Excellency that I lost nothing in the bargain." The whole letter, and particularly Señor Zarate's account of his interviews and conversations with Drake, and of what Drake told him respecting the death of Doughty, is very interesting. Señor Peralta has presented the sheets of the part of his work relating to Sir F. Drake, to the Society.

An Australian Geographical Society.—At an influential meeting of the friends of geography held in Sydney on the 2nd of April last, it was resolved to found a Geographical Society in Australia. The objects were defined to be the advancement of geographical science in its broadest meaning, the study of commercial geography, completion of the explorations of Australia, and the diffusion of the knowledge of the great Australian colonies and their resources throughout the world. The Society is to be constituted on a federal basis to embrace all the colonies,

and will probably be called the "Geographical Society of Australasia." Mr. La Meslée has been appointed Secretary, and nearly 100 members have been enrolled in Sydney alone. Some of the chief promoters are Fellows of our Society, and well known for their works, or for the interest they have shown in geographical subjects, among them Mr. J. J. Shillinglaw, Mr. Eccleston Du Faur, Captain C. Pasco, and Mr. R. Arrowsmith.

Projected Scientific Expedition to Mount Owen Stanley.—Mr. Henry O. Forbes, writing from Timor, informs us that he is about to visit the southern coast of New Guinea, and make an attempt to reach Mount Owen Stanley and the snowy range of the interior of the island. With the experience he has gained during his four years' explorations among the islands of the Malay Archipelago and the knowledge and skill he has acquired as a naturalist, he cannot fail of making interesting discoveries if he succeeds in reaching any part of the mountainous centre of New Guinea, and in staying there some months. Since his visit to the Keeling Islands early in 1879, of which he sent us an account,* he has been engaged in exploring Java, Sumatra, and Timor Laut. In Sumatra he fixed the height of many important points in the south-western part of the island, among others Mount Dempo, which he ascended, and determined the altitude by boiling-point observations to be 10,562 feet.

CORRESPONDENCE.

51 Holland Road, South Kensington,

Dear Lord Aberdare, *June 18th*, 1883.

With reference to my recent letter published in our 'Proceedings' on the subject of the East Bygd of the Greenland Colony, a communication addressed to your Lordship, not by name, but as President of the Royal Geographical Society, has arrived from the Hague, under the date of the 1st of June, in the following words:—

"Sir,—After reading the letter of Mr. Major in the 'Proceedings' of the Royal Geographical Society, vol. v. No. 5, May 1883, page 294, I came by chance on a Dutch chart from about 1705, which I take the liberty to inclose.

"In my opinion, it shows clearly that East Bygd, as described by Ivar Bardsen in 1349, is situated on the coast of Greenland, eastward from Cape Farewell, as supposed by Baron Nordenskiöld.

"As a stranger I beg to excuse the liberty of writing you this letter.

"I have the honour to be, sir,

"Your obedient servant,

"P. J. Buyskes."

I think it was a very courteous and obliging act on the part of Mr. Buyskes to send this chart, and one deserving the cordial thanks of the Council, and I would beg permission to say a few words of reply, in the hope that they may be printed in

* 'Proceedings,' 1879, p. 777.

the next number of the 'Proceedings.' The chart, which is without a date, but early in the eighteenth century, is entitled "Pascaerte van Groenland, Ysland, Straet Davids en Jan Mayen Eyland. By Casp^{r} Loots-man en Jaco^{s} Conynembergh, Zee-Caart-verkoopers op't water in de Loots-man. Amsterdam." The persons named are not of necessity the authors, but the sellers of the chart, the Dutch word "by" being, in this case, the equivalent of the French word "chez," and "verkooper" is a "seller" or "dealer." On the east coast of Greenland, due west of Iceland, are inserted several names, but most of them in a grossly corrupted form, unquestionably representing places, both in and out of the East Bygd, mentioned by Ivar Bardsen. The occurrence of such information on a published map, is, no doubt, *primâ facie*, of a very imposing character, but where I would beg leave to differ from Mr. Buyskes is in his conclusion that "it *shows clearly* that East Bygd, as described by Ivar Bardsen in 1349, is situated on the coast of Greenland, eastward from Cape Farewell." That printed documents are not always vehicles of correct information is proved by the testimony of this very chart, on which what was till recently known as Frobisher's Strait is placed, not in America, but across the south part of Greenland. The question, like that of the site of the Greenland colony, was a hazy one. Even the learned Icelandic historian Torfæus had already but a short time before adopted and printed the oft-repeated blunder, but it was no less a blunder because it was made by that distinguished man; nor is the author of the Dutch map one whit more to be relied upon because he has adopted a blunder which the illustrious Torfæus had adopted before him. On the other hand, an author's work is not to fall under utter condemnation because he has published a blunder, whether adopted or original. Let us, therefore, revert to the testimony of the Dutch chart as to the Greenland colony. Either it was a purely theoretical inference from the nautical instructions and chorography of Ivar Bardsen, or it indicated a practised and well-recognised route to the site of the colony. That the latter supposition is impossible is placed beyond all doubt by the numerous expeditions sent out by the Kings of Denmark in search of the colony from the sixteenth century downwards to that of Captain Graah in 1828–31, and, in fact, by the present most important exploration of our illustrious medallist, Baron Nordenskiöld, in which we are all so much interested. It remains, therefore, that it was purely a theoretical deduction from the language of Ivar Bardsen. I also formed my own deductions from that language, and stated the grounds of them in my former letter, which I need not now repeat. I propounded them first in 1873, both in my work on the Zeni and also in a paper read before our Society and published in the 'Journal,' and no one yet has pointed out where they were at fault. Practical investigation of the country, however, must be a far more powerful means of proving facts than the most logical deductions from words, and if our distinguished medallist is able to settle this moot point beyond all theory, no one will rejoice more sincerely than myself, whether he confirms or disproves my own conclusions.

Dear Lord Aberdare,

Yours, &c.,

R. H. Major.

REPORT OF THE EVENING MEETINGS, SESSION 1882-3.

Eleventh Meeting, 7th May, 1883.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*C. F. Castor, Esq.*, M.D.; *George Kelly, Esq.; Duncan Kennedy, Esq.; C. J. R. Le Mesurier, Esq.; Kenric B. Murray, Esq.; H. C. Richardson, Esq.; Lieutenant-Colonel C. J. C. Roberts; James Robertson, Esq.; George Rutherford, Esq.; Frederick Verney, Esq.*

The following paper was read :—

"Visits to the Eastern and North-Eastern Coasts of New Guinea." By Wilfred Powell.

Will be published in the August number of the 'Proceedings.'

Thirteenth Meeting, 11th June, 1883.—Major-Gen. Sir H. C. RAWLINSON, K.C.B., in the Chair.

ELECTIONS.—*Edwin Clerk Allam, Esq.*, C.E.; *Rev. Charles Alexander Blackburn; Rowland Hill Blades, Esq.; Minard Cammell, Esq.; Edward Hatton Cookson, Esq.; Joseph Deeley, Esq.; M. Henry Hindle, Esq.; James Mann, Esq.; George Sheppard Morgan, Esq.; Emil Teichmann, Esq.*

The CHAIRMAN, in opening the business of the meeting, explained that the President (Lord Aberdare) was detained in the House of Lords, and that he (Sir H. Rawlinson) had been requested to take the chair in the interim.

He then announced that a telegram of some importance had been received from the Agent of the Eastern Telegraph Company at Zanzibar, relating to the expedition of Mr. Joseph Thomson, who, as they were all aware, was engaged in a journey from the eastern coast of Africa viâ Kilimanjaro to Lake Victoria. He had met with difficulties thus early in the march, but they did not seem to be insurmountable. He had come down to the coast, and it was hoped that he would start again in a few days. The telegram was as follows :—

"1st June, 1883.—Thomson reached Dgare na Erobi, in Masai country, long. 37°, lat. 3° 5′, on 5th May. Was compelled to flee during night to evade what could only have been a disastrous fight, through troubles raised by Fischer's caravan in front. Got safely back to Taveta, where he camped his men, and has come down to Mombasa with small party in seven marches to replenish his goods, which has become necessary in consequence of his retreat from Masai and prolonged detention at Taveta. Returns in a few days to Taveta to proceed by Arusha, probably in company of another caravan. Is in good health. Details by post."

Dr. Fischer, the German explorer mentioned in the telegram, it appears had planned a similar journey to that of Mr. Thomson, but it had been hoped that, in so wide an extent of new country, it might have been so arranged that the two travellers would proceed by different routes. It appeared, however, that Dr. Fischer, having gone on in advance, must have passed to the west of Kilimanjaro whilst Mr. Thomson, taking a new route to the east and north of that mountain, overtook

the party. The chief evil of this misadventure was the loss of time; otherwise, Mr. Thomson did not appear to have suffered in men or goods. After replenishing his caravan he would return to prosecute his journey, and it was to be hoped that in a few days information would be received that he had actually started.

The following paper was then read:—

"A Journey from Mossamedes to the River Cunené, South-West Africa." By the Earl of Mayo.

Will be published, with the author's map and the discussion, in a subsequen number of the 'Proceedings.'

THE ANNIVERSARY MEETING, May 28th, 1883.

The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*Leon Abraham Emanuel, Esq.; His Grace the Duke of Portland; Osbert Salvin, Esq.*, F.R.S.; *John Sutherland, Esq.*

At the commencement of the proceedings, the Secretary, Mr. C. R. Markham, read the rules which govern the business of Anniversary Meetings, and the Minutes of the Meeting on the 22nd of May, 1882.

The President next appointed General Sir James E. Alexander and Mr. Trelawny Saunders Scrutineers for the Ballot.

Mr. Markham then read the Annual Report of the Council, which was as follows:—

REPORT OF THE COUNCIL.

The Council have the pleasure of submitting to the Fellows the usual annual Report on the financial and general condition of the Society:—

Members.—The number of Fellows elected during the year (ending April 30th, 1883) was 163, besides three Honorary Corresponding Members. In the previous year, 1881–2, the total elections amounted to 150, and in 1880–81 the number was 168. The losses have been, by death 54, including two Honorary Corresponding Members, by resignation 34, and by removal on account of arrears of subscription 41, making the net increase for the year 37. In the year 1881–2 there was a decrease of 31; in 1880–81, the net increase was 13; in 1879–80, 58. The total number of Fellows on the list (exclusive of Honorary Members) on the 1st of May was 3392.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending 31st December, 1882 (exclusive of balance in hand and 1005*l.* 8*s.* 2*d.*, sale of Exchequer Bills), was 7937*l.* 6*s.* 10*d.*, of which 5652*l.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1881, the total net income was 8809*l.* 19*s.* 5*d.*, and the amount of subscriptions, &c., 6480*l.* 6*s.* 6*d.*; in 1880 the two totals were 8599*l.* 18*s.* 4*d.*, and 6236*l.* respectively.

The net expenditure for the past year (exclusive of balance in hand) was 8779*l.* 10*s.* 7*d.*, including 1135*l.* 10*s.* spent on Expeditions. The net expenditure in 1881 was 8362*l.* 5*s.* 6*d.*; in 1880, 8454*l.* 1*s.* 10*d.*; in 1879, 6990*l.* 14*s.* 2*d.*

The Finance Committee of the Council have held, as usual, Monthly Meetings

during the year, supervising the accounts of the Society. The Annual Audit was held on the 16th of March last, the Auditors being, on behalf of the Council Lord Cottesloe and Sir Rawson Rawson, and on behalf of the Fellows at large, E. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

"The Auditors appointed for the examination of the Accounts of the Royal Geographical Society for the year ending 31st December, 1882, beg to report that they have examined the Balance Sheet submitted to them, and compared it with the Cash Book, Bankers' Book, Petty Cash Book, 'Proceedings' Advertisement Books, and other books of account kept by the Society, and have verified the Balance in the Bankers' Pass Book and in the hands of the clerk in charge of the Petty Cash; they have checked the entries in the Cash Book, and examined all the vouchers for payments made, and have found the same to be correctly stated and sufficiently vouched.

"They have also had produced to them letters from the Deputy Accountant of the Bank of England, and from Messrs. Cocks, Biddulph, and Co., Bankers, showing that the following investments were standing to the credit of the Society on the 31st December, 1882:—

	£	s.	d.
India 4 per Cent. Stock	1000	0	0
India 4 per Cent. Debenture Stock	2000	0	0
Great Western Railway 4½ per Cent. Debenture Stock ..	1800	0	0
London and North-Western Railway 4 per Cent. Debenture Stock	1000	0	0
North-Eastern Railway 4 per Cent. Debenture Stock ..	1000	0	0
Great Indian Peninsula Railway Guaranteed 5 per Cent. Capital Stock	4000	0	0
Caledonian Railway 4 per Cent. Preference Stock, No. 1	2000	0	0
Consols (Lambert Donation)	526	6	4
Consols	4214	0	6
Consols (Peek Fund)	1000	0	0

"The sale of 1000*l.* of Exchequer Bills was rendered necessary to meet the Society's contribution to the '*Eira* Relief Expedition,' which increased the expenditure of the year to that extent; but this sum has since been generously presented to the Society by Mr. Leigh Smith, and will be brought to account in the receipts and investments of the present year.

"The Arrears of Subscriptions, as well as the Receipts from Entrance Fees and Life Compositions, appear to have been affected by the general financial depression existing in the past year. The former have increased from 1302*l.* to 1612*l.*, which, if valued, according to precedent, at one-half, would represent an asset of 806*l.*; but which, on the experience of the last five years, during which there has been a continuously increasing reduction in the amount recovered, cannot now be calculated at more than 40 per cent., and would therefore represent an asset of 644*l.*

"The protracted illness and subsequent death of the Society's Chief Clerk has not interfered with the regular keeping of the accounts, which has been carried on by the present first clerk, under the superintendence of the Assistant-Secretary; and the Auditors have satisfaction in reporting that the accounts have been correctly and well kept, and submitted in good order for their examination.

"The Investments and Assets of the Society on 31st December, 1882, exclusive

of the Map Collection and Library, amounted to 39,831*l.* 11*s.* against 39,675*l.* 6*s.* 7*d.* at the close of the preceding year.

"16th March, 1883."

"COTTESLOE,
"RAWSON W. RAWSON,
"E. O. TUDOR,
"J. D. THOMSON,
} *Auditors.*

BALANCE SHEET FOR THE YEAR 1882.

Receipts. *Expenditure.*

1882.	£ s. d.	£ s. d.	1882.	£ s. d.	£ s. d.
Balance in Bankers' hands 31st Dec. 1881	475 16 10		*House*:—Taxes and Insurances, Repairs, Improvements and Furniture, Coal, Gas and Water-rates, &c.	.. ..	273 17 3
Do. Accountant's do.	8 2 11				
		483 19 9			
Subscriptions:—			*Office*:—Salaries and Gratuities, Stationery and Printing, Postages and Parcels, &c.	.. ..	1,644 14 3
For the current year	3,815 0 0				
Paid in advance	606 0 0				
Arrears	397 0 0				
		4,818 0 0			
Entrance Fees	.. ..	390 0 0	*Library*:—		
Life Compositions	.. ..	444 0 0	Salaries and Books, Printing Library Catalogue	.. ..	701 9 8
Payments paid in error	.. ..	49 4 0			
Parliamentary Grant	.. ..	500 0 0			
Royal Premium	.. ..	52 10 0	*Map-Room*:—		
Rent of Shop and Vaults	.. ..	136 14 2	Salaries and Gratuities, Maps, and Printing Map Catalogue, &c.	.. ..	1,447 12 9
Publications, Sale of, and Advertisements	.. ..	584 12 9			
Loan of Diagrams	.. ..	1 11 6	*Meetings*	.. ..	199 3 6
Payments for Scientific Instruction, and Subscriptions to Map of Equatorial Africa	.. ..	92 0 9	*Scientific Purposes Grant*:— Instruction to Travellers, Map of Eastern Equatorial Africa	.. ..	140 12 0
Contribution from the British Association towards the East African Expedition	.. ..	100 0 0	*Medals* and other awards	.. ..	164 11 10
			Publications:—Printing Proceedings and Part I. of Supplementary Papers, Maps and Illustrations, &c.	.. ..	3,024 12 4
Sale of 1000*l.* Exchequer Bills	.. ..	1,005 8 2	*Payments* in error returned	.. ..	37 7 0
Dividends:			*Donation* to Mrs. Emily Beke	.. ..	10 0 0
North-Eastern Railway 4 per Cent. Debenture Stock 1000*l.*	39 3 4		*Expeditions*:—		
Great Indian Peninsula Railway 5 per Cent. Stock 4000*l.*	225 4 2		Contribution to the *Eira* Relief Expedition	1000 0 0	
Great Western Railway 4½ per Cent. Debenture Stock [Davis Bequest] 1800*l.*	74 18 2		Expenses on account of East African Expedition	135 10 0	
					1,135 10 0
London and North-Western Railway 4 per Cent. Debenture Stock [Murchison Bequest] 1000*l.*	39 3 4		*Balance* in Bankers' hands 31st Dec. 1882 (excluding draft not cashed)	453 2 2	
Exchequer Bills (since sold) 1000*l.*	29 5 7		Do. Accountant's Do.	15 14 11	
Caledonian Railway 4 per Cent. Preference Stock 2000*l.*	78 3 5		Do. Messrs. Stanford's (since paid)	178 7 1	
					647 4 2
Consols 3669*l.* 2*s.* 2*d.*	107 15 8				
„ [Peek Fund, 1000*l.*	14 13 9				
„ [Back bequest] 561*l.* 0*s.* 8*d.*	16 9 6				
„ [Trevelyan bequest] 510*l.* 4*s.* 0*d.*	14 19 10				
India Stock 1000*l.*	39 0 10				
India 4 per Cent. Debentures 2000*l.*	78 6 8				
Interest on 1000*l.* deposited from Feb. 14th to Aug. 16th	11 9 5				
		768 13 8			
	£	9,426 14 9		£	9,426 14 9

REGINALD T. COCKS,
Treasurer.

Audited and found correct, the 16th day of March, 1883.

COTTESLOE,
RAWSON W. RAWSON,
E. O. TUDOR,
J. D. THOMSON,
} *Auditors.*

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec., 1882.

	Year.	Cash Receipts within the Year.	Cash Amounts invested in Funds.	Deducting Amounts invested in Funds; actual Expenditure.
		£ s. d.	£ s. d.	£ s. d.
[1]Includes Treasury Grant of 1000*l.* for the East African Expedition.	1848	696 10 5	.. ..	755 6 1
	1849	778 3 0	.. ..	1,098 7 6
[2]Includes Treasury Grant of 2500*l.* for the East African Expedition.	1850	1,036 10 5	.. ..	877 2 10
	1851	1,056 11 8	.. ..	906 14 7
	1852	1,220 3 4	.. ..	995 13 1
[3]Includes Legacy of Mr. Benjamin Oliveira, 1506*l.* 17*s.* 1*d.*	1853	1,917 2 6	.. ..	1,675 6 0
	1854	2,565 7 8	.. ..	2,197 19 3
[4]Includes Legacy of Mr. Alfred Davis, 1800*l.*	1855	2,584 7 0	.. ..	2,636 3 1
	1856	[13]3,372 5 1	533 10 0	2,814 8 1
[5]Includes Legacy of Sir Roderick Murchison, 1000*l.*	1857	3,142 13 4	378 0 0	3,480 19 9
	1858	3,089 15 1	.. ..	2,944 13 6
	1859	3,471 11 8	950 0 0	3,423 3 9
[6]Includes Mr. James Young's Grant for Congo Expedition, 2000*l.*	1860	[2]6,449 12 1	466 17 6	5,406 3 7
	1861	4,792 12 9	1,358 2 6	3,074 7 4
	1862	4,659 7 9	1,389 7 6	3,095 19 4
[7]Includes 1009*l.* 14*s.* 6*d.* sale of Exchequer Bills.	1863	5,256 9 3	1,837 10 0	3,655 4 0
	1864	4,977 8 6	1,796 5 0	3,647 7 10
[8]Includes Mr. James Young's Grant for the Congo Expedition, 1041*l.* 14*s.*	1865	4,905 8 3	1,041 5 0	4,307 4 5
	1866	5,085 8 3	1,028 15 0	4,052 15 0
	1867	5,462 7 11	1,029 0 6	3,943 17 4
	1868	5,991 4 0	1,857 3 9	4,156 17 10
[9]Includes Parliamentary Grant of 3000*l.* to Cameron Expedition.	1869	[3]6,859 16 0	2,131 5 0	4,646 0 8
	1870	[4]8,042 6 1	3,802 6 0	3,845 10 6
	1871	[5]6,637 3 7	1,000 0 0	3,726 4 4
	1872	[6]8,149 7 9	1,999 4 6	5,871 13 2
	1873	[7]7,761 18 10	2,015 1 8	6,697 12 6
[10]Includes Donation of 500*l.* by Mr. C. J. Lambert.*	1874	[8]8,753 5 10	499 0 0	7,876 2 3
	1875	7,934 15 10	2,002 7 6	5,683 4 10
[11]Includes Legacy of Admiral Sir George Back, 540*l.*	1876	[9]11,611 11 8	.. ..	6,870-13 1
	1877	[10]7,950 1 11	2,538 2 0	8,940 17 11*
[12]Includes Legacy of Sir W. C. Trevelyan, 500*l.*	1878	[11]8,124 10 0	3,000 0 0	6,361 9 6
	1879	[12]8,979 14 10	1,551 10 10	6,990 14 2
[13]Includes 1005*l.* 8*s.* 2*d.*, sale of Exchequer Bills.	1880	8,599 18 4	1,567 5 1	8,454 1 10†
	1881	8,809 19 5	.. ..	8,362 5 6‡
	1882	[13]8,942 15 0	.. ..	8,779 10 7

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS—31st December, 1882.

			£ s. d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library insured for 10,000*l.*)	..		20,000 0 0
Investments (amount of Stock), as detailed in the above Report of the Auditors	..		18,540 6 10
Arrears due on December 31, 1881 .. .. .. £1612			
Estimated at	.. .. ..		644 0 0
Balance at Bank	£453 2 2		
„ in Accountant's hands	15 14 11		
„ Messrs. Stanfords (since paid)	178 7 1		
			647 4 2
Total			£39,831 11 0

Publications.—The monthly 'Proceedings' has been issued with regularity during the year; the twelve numbers for 1882 forming a volume of 808 pages, illustrated by 29 original maps and 11 pictorial engravings. The first part of the new publication entitled 'Supplementary Papers,' commenced on the discontinuation

of the 'Journal,' was published early in the year. This publication, as previously announced, is not intended to be issued at regular periods, but being instituted for the reception of Memoirs too long or elaborate for the monthly 'Proceedings,' will be issued as material offers. The first Part contains Mr. E. Colborne Baber's Reports of his Journeys in Western China, and comprises 201 pages, illustrated by 5 maps and 23 diagrams and engravings.

The total cost of the monthly 'Proceedings' for 1882 was 2027*l.* 0*s.* 1*d.*, this amount including 280*l.* 16*s.* 7*d.* for free delivery to Fellows and 572*l.* 9*s.* 4*d.* for maps. The cost of Part I. 'Supplementary Papers' was 327*l.* 13*s.* 5*d.*, including 143*l.* 11*s.* for maps and engravings. Against this expenditure is to be set the sum of 544*l.* 2*s.* 7*d.* received from sales to the public and advertisements.

Four editions of the Society's 'Hints to Travellers' having been exhausted, a new edition has been prepared by Colonel Godwin-Austen, Mr. Laughton, and Mr. D. Freshfield, under the direction of a large Committee of Council, and will be published in the course of the present month. The volume has been so largely modified and increased as to be practically a new work. Amongst the additions will be found chapters on Geology, by Mr. Blanford: on Anthropology, by Dr. Tylor; Medical Hints, by Dr. Dobson; and Hints on Outfit. The Scientific Hints have been recast by Mr. Coles, the Society's Map Curator and Scientific Instructor.

Scientific Purposes Grant.—During the past year fifteen intending travellers have received instruction under Mr. Coles, in Practical Astronomy in the Society's Observatory, and in route-surveying in the country. One of the gentlemen (Mr. C. E. Peek) who had gone through the course of instruction, was selected by Mr. E. J. Stone, Radcliffe Observer, to proceed to Brisbane to observe the transit of Venus, and others have since left England for the following destinations:—The Congo, the Niger, Gold Coast, Central America, Brazil, British Guiana, Central Africa, India, and China. Three pupils are at present under instruction; the total number of lessons given during the year was 260.

The second part of the Society's large Map of Eastern Equatorial Africa, by Mr. Ravenstein, comprising 6 sheets, was issued during the year, and the sum of 27*l.* 2*s.* expended upon it for extra colouring. The third and concluding part is now in the press.

Expeditions: Grants of Instruments to Travellers.—The Society's new Expedition to East Africa, under Mr. Joseph Thomson, started at the latter end of the year, having for its object the exploration of a direct route from the coast to the eastern shore of Victoria Nyanza, and also the examination of Mount Kenia. The sum of 266*l.* 18*s.* was expended on Mr. Thomson's outfit and preliminary expenses, but part only of this appeared in the accounts of 1882. The total expenditure is not to exceed 3000*l.*

Instruments to the value of 432*l.* 17*s.* have been supplied during the past year to the following travellers:—Captain H. P. Dawson, R.A., Circumpolar Expedition, 99*l.* 14*s.*; Mr. J. T. Last, East Africa, 41*l.*; Mr. H. E. O'Neill, Mozambique, 90*l.*; Mr. Henry Whitely, British Guiana, 10*l.* 10*s.*; Mr. Joseph Thomson, East Central Africa, 145*l.*; Rev. Thos. Wakefield, East Africa, 21*l.*; Mr. E. Douglas Archibald, 25*l.*

The instruments lent to the late Mr. William Appel have been returned.

Library.—628 books and pamphlets have been added during the past year; 540 by donation or exchange, and 88 by purchase. The system of presentation of new works by publishers, with the object of obtaining notice in the Bibliography of our 'Proceedings,' continues materially to lessen the necessity of purchasing new books, published both here and on the Continent.

92 pamphlets and small works have been put in covers on the Society's premises, and 300 volumes have been bound.

The sum of 62*l.* 4*s.* 4*d.* has been expended in purchasing books, and the further sum of 96*l.* 1*s.* 6*d.* in binding for the Library.

Among the more important accessions are:—The 4th volume of the great descriptive work 'Die Balearen,' presented by the Archduke Ludwig Salvator of Austria; Santo's 'Ethiopia Oriental,' 1609; the facsimile of the Stockholm copy of Marco Polo; the completion of Zaragoza's 'Quiros'; Shipp's 'History of Hernando de Soto and Florida'; João de Castro's 'Roteiro de Lisbon a Goa' annotated by J. de Andrade Corvo (Lisbon Academy of Sciences); the 'Ambassades de la Compagnie Hollandoise vers l'Empereur du Japon,' 1722; continuations of the General Report of the Surveys of India, of Max Müller's 'Sacred Books of the East,' vols. VI. and X. of Atkinson's 'Gazetteer of the North-West Provinces,' and other minor publications (H.M. Secretary of State for India); continuations of the 'Memoirs and Records of the Geological Survey of India' (the Indian Government, through Dr. Oldham), and of the publications of the Intelligence Department of the War Office; vols. II. and III. of the 'Memoirs of the Survey of Western Palestine'; 'Monografia della Città di Roma e della Campagna Romana,' with 3 Appendices and Atlas (The Italian Minister of Agriculture, Industry, and Commerce, at the intercession of Admiral Sir Erasmus Ommanney); the 2nd edition of 'Studi biografici e bibliografici sulla Storia della Geografia in Italia' (Prof. Dalla Vedova); Reports, papers, and continuations of Publications of the U.S. Geological and Geographical Survey under Prof. Hayden, the Surveys West of the 100th Meridian, under Lieut. Wheeler, the Survey of the Rocky Mountains Region, under J. W. Powell (with his Report on the Arid regions and Utah), the Coast and Geodetic Surveys, under C. P. Patterson, the Geological Survey, under Clarence King, the U.S. War Department and the Engineer Department of U.S. Army (including Symons' Report on the Upper Columbia), the Bureau of Ethnology, under J. P. Powell, the Bureau of Navigation, the U.S. Hydrographic Office (including the American Ephemeris from 1855 to date), and the Department of the Interior, including papers by Brown Goode, Elliott, Ingersoll, Swank, and Clarence King (presented by the various named departments of the U.S. Government, or the officers in charge); Reports of Surveys and other publications from various branches of the Canadian, Newfoundland, and Queensland, Victoria, New South Wales, and New Zealand Governments; the Census of Guatemala, with supplementary papers (the Guatemalan Ministry); Pereira's 'Etats-Unis de Colombie,' (Colombian Government, per H. M. Foreign Office); Covarubbias's 'Viaje de la Comision Astronomica Mexicana al Japon' (the Mexican Ministry); the Zoological and Botanical Appendices to General Roca's Report of the Rio Negro Expedition (the Argentine Ministry); Helmersen and Von Schrenck's 'Beiträge,' so far as published; the completion so far as published of Von Schrenck's 'Reisen im Amur Lande'; the continuation of the account of the German Loango Expedition, and of Veth's 'Midden Sumatra'; contributions by Urechi, Dapontès, Michels, Machéras, Barbier de Meynard, and Pavet de Courteille to the Publications de l'Ecole des Langues Orientales Vivantes: vols. I. and II. of Schefer and Cordier's 'Recueil de Voyages'; the recent issues of 'Cochin-Chine Française: Excursions et Reconnaissances'; various grammatical works on Swahili, Boondéi, Ashanti, Fanti, Grebo, Japanese, &c. (by or through Mr. R. N. Cust and Mr. C. H. Wallroth); Lycklama a Nijeholt's 'Voyage en Russie,' &c.; Javorsky's Travels of the Russian Mission in Afghanistan (Author, in Russian); the first vol. of 'Scientific Results of the *Vega* Voyage' (Baron Nordenskjöld); continuations of the Hakluyt Society's Publications, the Norwegian North Atlantic Expedition (Prof. Mohn), St. Martin's 'Nouveau Dictionnaire de Géographie Universelle,' Reclus's 'Géographie Universelle' (Author), Von Richthofen's 'China' (Author), Raimondi's 'Peru' (Author, per Col. Almonte), the 'Encyclopædia Britannica,' ninth edition (vols.

XIV. and XV., Messrs. A. and C. Black), 'Cassell's Natural History,' &c. (Publishers), and Perret's 'Les Pyrénées'; the new edition to date of Murray's and Bædeker's Guide Books, Gaffarel's 'L'Algérie,' Crevaux's 'Voyages dans l'Amérique du Sud,' Kreitner's 'Im fernen Osten' (Herr A. Holder), Révoil's 'Vallée du Darror' (Author), Floyer's 'Unexplored Baluchistan' (Author), Macgregor's 'Balochistan,' O'Donovan's 'Merv Oasis,' Capello and Ivens's 'From Benguella to the Territory of Yacca,' and Lock's 'Gold' (Author).

Seven new presses have been erected in the gallery and working room, under the direction of the Library and Map Committee; these will hold some 2000 volumes, and defer for some time the need of increased Library room.

Map Room.—The accessions to the Map-Room Collection during the past year comprise 1094 Maps and Charts on 1683 sheets; 13 Atlases, containing 341 sheets of Maps; 365 Photographs and Views. Of these 20 Maps on 566 sheets, 3 Atlases on 62 sheets, and 9 Views have been purchased. The accessions are in excess of those of last year by 437 Maps on 699 sheets, 2 Atlases, 324 Photographs, and 1 Relief Map.

Among the most important donations to the Map-Room Collection are:—the fine Relief Map of the Lake District of East-Central Africa (presented by Lieutenant-Colonel J. A. Grant); 294 sheets of the Ordnance Survey of the British Isles (presented by the First Commissioner of Public Works, through the Director-General of the Ordnance Survey), 139 Charts of the British Admiralty (presented by the Lords Commissioners of the Admiralty, through the Hydrographer), 9 Albums, containing 272 Photographs of the scenery, natives, &c., of Japan, Java, Mexico, West Indies, South America, and Australasia (presented by C. H. Wallroth, Esq.); 294 sheets of the various Indian Government Surveys (presented by H.M. Secretary of State for India), 10 sheets of Maps (presented by the Intelligence Branch of the Quartermaster-General's Department), 43 French Charts (presented by the Dépôt des Cartes et Plans de la Marine), 27 United States Charts (presented by Commodore J. C. P. de Krafft, U.S.N., Hydrographer to the Bureau of Navigation), 34 Maps on 64 sheets of New South Wales and Queensland (presented by C. E. Peek, Esq.), 11 Maps, published in Petermann's 'Geographische Mittheilungen' (presented by Dr. E. Behm), 8 sheets of Sveriges Geologiska Undersökning (presented by the Director of the Survey), 18 sheets of Norwegian Government Surveys (presented by l'Institut Géographique de Norvége), 27 sheets of Maps of various parts of the Chinese Empire (MS.), from the Chinese Atlas of the Jesuits, with Notes (presented by C. T. Gardner, Esq.); 31 sheets of Maps, by Dr. H. Kiepert (presented by the Author); 13 sheets of Maps, published by Dietrich Reimer (presented by the Publisher).

The Maps in the Society's Collection have been made frequent use of by the Fellows of the Society, public officers, and the general public. The large Maps and Views have been lent for the purpose of illustrating lectures at public institutions, as well as to private individuals. Thirteen new Diagrams have been constructed on the premises.

The adoption of the above Report was moved by Colonel J. U. Bateman Champain, R.E., seconded by Mr. Hormuzd Rassam, and carried unanimously.

PRESENTATION OF THE ROYAL MEDALS.

The Royal Medals of the year for the Encouragement of Geographical Science and Discovery had been awarded by the Council as follows:—

The Founder's Medal to Sir Joseph Dalton Hooker, F.R.S., for his eminent services to scientific geography, extending through a long series of years and over a large portion of the globe, while engaged in voyages in the Antarctic and Australian Seas,

and journeys in India and the Himalaya, in Morocco, and in the United States of America; and more especially for his long-continued researches in botanical geography, which have thrown light on the form of the land in prehistoric times, and on the causes of the present distribution of the various forms of vegetable life on the earth.

The Patron's Medal to E. Colborne Baber, Chinese Secretary of Legation, Peking, in recognition of the great value of his scientific work, chiefly geographical, during many exploratory journeys in the interior of China; and for his Reports of these journeys, drawn up with admirable skill, accuracy, and completeness, which he presented to the Society, and which have been published, together with route maps engraved from his own finished drawings, in the first part of the 'Supplementary Papers.'

In presenting the Founder's Medal to Sir Joseph Dalton Hooker, the President addressed him in the following words:

I have the highest satisfaction in presenting to you the Founder's Gold Medal, intrusted by the Crown to the Royal Geographical Society to be conferred in recognition of eminent services in the cause of geography.

Having devoted your life, as was natural to the son of a father illustrious in botanical science, mainly to the extension of that science in all its various branches and bearings, you have yet earned your title to a distinguished place among the geographical explorers of Great Britain.

In 1839, at the early age of 22, you were appointed botanist to the Antarctic voyage of exploration of the *Erebus* and *Terror*, commanded by Sir James Clark Ross; visiting in 1840 and the three succeeding years, Kerguelen Island, New Zealand, Australia, and the Falkland Islands—years of danger, hardship, and severe labour, turned by you to admirable account. It was during this voyage that you accompanied Ross in his three attempts to reach the Southern Pole, which resulted in the attainment, during two successive seasons, of a far higher southern latitude than had previously been reached, or has been reached since; in the discovery of the Antarctic Continent, of the great Ice-Barrier, and of the active volcano, Mount Erebus, in the 80th degree of S. latitude. Besides contributing to the narrative of that memorable voyage, you collected materials for your great works on the Flora Antarctica, Novæ Zelandiæ, and Tasmanica, in six quarto volumes, which established your reputation as a botanist of the highest eminence.

During the progress of these works you became attached to the Geological Survey of Great Britain, and profited by your opportunities of observation, the results of which were given in several important papers on "Fossil Botany."

But it was in the interval between 1847 and 1853 that you accomplished that work which has most closely associated you with geographical pursuits. Armed with knowledge of the highest importance and advantage to a geographical explorer, and full of the requisite ardour and enthusiasm, you resolved to prosecute the exploration of some of the most elevated and least known regions of the great Himalayan range. Three years and a half were devoted to this object; and your work 'Himalayan Journals; or, Notes of a Naturalist in Bengal, the Sikkim and Nepaul Himalayas, the Khasia Mountains, &c.,' has established your title to the rank of a geographical explorer and observer of high merit. During two seasons you explored, unaccompanied by any European, the loftiest and most precipitous of the Himalayan passes and valleys; afterwards, on the borders of Tibet, in the company of Dr. Campbell, you incurred imprisonment and considerable danger both from the rude region and its ruder inhabitants. The result of these travels, besides an ample botanical harvest, was a survey of the whole country of Sikkim, and the bordering districts of Nepaul, from the plains of India to Tibet; which, published

in the Trigonometrical Survey Office of Calcutta, is still the standard map of the country; and, even now, after the lapse of thirty years, several of those passes, one of which was nearly 19,000 feet high, then discovered and measured by you, have as yet been visited by no one else. Of the botanical results of these bold and enterprising journeys, your folio on the 'Rhododendrons of the Sikkim Himalayas,' illustrated by your own skilful pencil, and your 'Flora Indica,' are only a part.

This is not the occasion to dwell on each step in your scientific career; but I cannot refrain from selecting for special remark the admirable lecture on "Insular Floras," delivered before the British Association at Nottingham in 1866, when your lucid exposition of the peculiar relations of the vegetable forms of the oceanic islands to those of the nearest continents threw light on interesting problems in physical geography as well as in biology. I am assured by the most competent judges that many of your papers subsequently published, especially the "Outlines of the Distribution of Arctic Plants," were masterpieces of patient grouping of facts, analysis and reasoning, and form a contribution of the highest importance to physical geography no less than to botany.

Since that time your diligent labours as first Assistant-Director, during the life of your father Sir William Hooker, and afterwards in 1865 your energetic and successful efforts, as Director of the Royal Botanical Gardens at Kew, to continue your father's work and enlarge its field of operations, have not prevented you from publishing works of vast volume and the highest scientific value on your favourite study.

Nor is this by any means a complete record of your geographical and botanical work. Your journey to Morocco, in company with our friend and associate, Mr. John Ball; your expedition to the Rocky Mountains, under the guidance of your eminent friends Professor Hayden and Dr. Asa Gray, give proof of your continued ardour as a geographical explorer and as a scientific observer. "No living botanist," writes the distinguished American botanist last named, "that we know of has shared Sir J. D. Hooker's opportunities of studying in place the living vegetation of so many parts of the world"; and I may venture to add, that none could have made a better use of those opportunities.

Your compeers in scientific eminence have not been slow to recognise your worth. You were in 1854 awarded a Royal Medal by the Royal Society of London. The Universities of Oxford, Cambridge, Glasgow, and Dublin have bestowed upon you their highest honorary degrees. In 1868 you were chosen President of the British Association at Norwich; in 1873 you received the still higher honour of being elected President of the Royal Society; and it would be unpardonable in me to omit the fact that at the Jubilee Meeting of the British Association, held at York in 1881, you delivered, as President of the Geographical Section, an address on the progress, within that period, of geographical knowledge in all its branches, but more especially with reference to the distribution of plants, of a breadth, completeness, and mastery of the subject, such as probably you alone, of living Englishmen, could have displayed.

After these honours, we cannot help feeling that even in offering to your acceptance our highest, we are reflecting more distinction on the Society which bestows than upon the man who accepts it.

Sir J. D. Hooker thus replied:

My Lord Aberdare, I request that you will accept yourself, and convey to the Council of the Royal Geographical Society my sincere thanks for the honour which they have awarded to me, together with the assurance of the high value which I attach to it.

It was a matter of great and sudden surprise to me to be informed, and this only

very lately, that my contributions to Geographical Science had been regarded as worthy of serious consideration on the part of the Fellows of the Geographical Society. I had always, and throughout my scientific life, felt that I laboured under a sense of great obligation to geographers; but I assure you it never occurred to me to suppose that I had in any sense repaid these debts. My Lord, while overrating, as I think, my efforts, you have, I fear, underrated the advantages under which I have worked. In sailing under the orders of Sir James Clarke Ross, to the Antarctic regions, I was serving under the greatest navigator since the days of Cook. In my journeyings in Syria and Palestine, I was for the first weeks the companion, or rather the guest, of Admiral Washington, then the Hydrographer of the Admiralty, and one who was for many years the honoured Secretary of this Society; and lastly, in my expedition to Morocco and the Greater Atlas, I had the advantage of being accompanied by a prince of European geography, our Fellow, Mr. John Ball, to whom we are indebted, rather than to me, for the geographical results of that journey. It would have been strange, indeed, if, working under such auspices, no part of my labours had been turned to the account of geographical science.

Again, it is not as a professed geographer that I have ever travelled. It was the pursuit of natural history that impelled me to wander first of all; and it is biological science which has been my constant travelling occupation, my main resource in prosperity, and my solace under trials and difficulties. If, therefore, I have done anything for the advancement of geographical science, it has been the outcome of researches pursued primarily with other objects in view; and this adds immeasurably to the satisfaction with which I receive this medal. But there is still another, and a far more weighty reason for my prizing the honour you have paid me; it is because it associates my name and my labours with those of so many great and remarkable men, whose services have proved them to be entitled to the gratitude of their country. In the short interval which elapsed between my hearing of the award of this medal, and my receiving it, I went to see my old and kind friend, your Assistant-Secretary, Mr. Bates, himself a traveller and naturalist, and the author of one of the best narratives of a naturalist that has ever been written. My object was to see a list of the Medallists of the Society; for though I knew by heart who most of them were, I wanted to refresh my memory with regard to the earliest of them, and to see their names in sequence. Mr. Bates handed me the list; it embraced just 100 names, comprised in a period of half a century. Of these no fewer than fifty were or had been personally known to myself; and amongst the very first of these were the names of the friends of my father and of my own earliest youth; men whose example had fired my ambition, whose kind words had fed my hopes, and whose counsel had directed my career and guided my footsteps as a very young naturalist and traveller. It is for associating my name with those of these men, that I do most of all feel deeply grateful to the Royal Geographical Society.

Next presenting the Patron's Medal, the PRESIDENT thus addressed Mr. Colborne Baber:

If the Royal Geographical Society were asked to justify their choice of you, among several distinguished competitors, for the honour of receiving our Patron's—The Queen's—Gold Medal, we should confidently refer to that first part of our first volume of 'Supplementary Papers,' published by the Society, and containing your "Travels and Researches in Western China."

The first of these travels—not in the order of printing, but in date—was the narrative of your mission under the Hon. T. Grosvenor in 1876, sent across Yunnan to Bhamo, to investigate the murder of Mr. Margary. This narrative, in spite of the disadvantage of making its appearance as a Blue-book, and therefore obtaining but a

limited circulation, yet "a fit audience found though few," and made European geographers acquainted with the fact that a geographical observer and narrator of remarkable power had appeared in the Far East. The map accompanying this Blue-book was from your survey.

This narrative was speedily followed by a Journey of Exploration in Western Ssŭ-ch'uan in 1877, upon which perhaps rest your highest claims as a traveller and explorer. This journey, which completed much which was attempted by our eminent medallist, Baron Ferdinand von Richthofen in 1872, who was baffled in his enterprise by native hostility, and which extended largely the knowledge of that vast district acquired by the distinguished French traveller Francis Garnier in 1868, was in great part over entirely new ground, and introduced us to the knowledge of several objects of the highest interest, such as, among many others, Mount Omi, a notable place of Buddhist pilgrimage, of which and its unique antiquities you gave a most graphic description; and as the little-known people, the Lolos, from whom you brought back copious specimens of their books, written in an alphabetic character which still remains undeciphered. But perhaps its greatest value depends upon the many important corrections of the Jesuit surveys in those parts, made in the time of the Emperor Kang-Hi, which for more than a century and a half have been the basis of all our maps of China.

Another journey in 1878 in the same province, when, following the earlier part of your former route westward from Kia-ting-fu, you turned northward by a new line of mountain country occupied by the Sifan tribes, to the now well-known town of Tachien-lu on the great Lhassa road, made a considerable addition to the accurate knowledge of those regions.

The same 'Supplementary Papers' also contain a most interesting and valuable monograph by you on the Chinese tea-trade with Tibet.

In all these journeys you made careful route surveys, checked by observations for latitude and longitude. The maps which have been published in our volume, embrace, on your principal journey alone, 121 astronomical determinations of latitude and 7 of longitude, and the care and neatness with which these surveys were drawn by you excited general admiration.

Of these great services to geography I have given only the dry outlines. It is the merest justice to you to add that your journeys have been exceptionally productive, because of the exceptional store of various and accurate knowledge with which you started on your travels. Your mastery of the Chinese language, and of Chinese customs and habits of thought, enabled you to collect a great amount of miscellaneous information, which has been conveyed in narratives full of novelty, vivacity, and sustained interest. Altogether both in these journeys and the report of their results you have displayed the qualities of an accomplished traveller in a degree of which we have had few examples and which fully justify our choice of you for sharing with Sir Joseph Hooker our highest distinction, even although you have, we firmly believe, only given the first-fruits of that rich harvest which we expect from your matured powers and enlarged experience.

Mr. E. Colborne Baber in reply spoke as follows:

In receiving this distinguished honour from your Lordship's hands, I beg to acknowledge my most complete and grateful recognition of the indulgence which has been extended to me by the Honourable Council of this Society. At the same time it will not, I trust, seem ungraceful or vainglorious if I affirm that one almost hopeless ambition of my life has to-day been realised. I make no doubt that all travellers in the dark places of the earth are animated with some hope of one day gaining the Gold Medal of this famous Society, the highest distinction which the geographical world can bestow. But in my case that coveted prize has been conferred so

unexpectedly—less, I take it, as a reward for work which I have done, than as an encouragement for work which I hope to do—that I cannot find words to express my sense of sudden glory and delight, and my most ardent desire to accomplish something more worthy of your consideration. If I might mingle a strain of regret with my pride and gratitude, I would say that the work for which I have been so lavishly rewarded was stimulated by the approval and sympathy of my lamented friend and fellow-traveller, Captain Gill, and I shall always associate the honour which you have conferred upon me with the memory of that fearless and faithful soul.

The Award of the Murchison, Back, and Cuthbert Peek Grants.

The terms of these awards were read by the President.

The Murchison Grant for 1883, to Wm. Deans Cowan, for his extensive surveys in the Tanala, Betsileo, and Bara Provinces of Central Madagascar, an account of which was read by him to the Society in June, 1882, and published in the September No. of the 'Proceedings' of the same year. Also as an encouragement to him in the new journey of exploration he is about to undertake in Western Madagascar.

The Back Grant for 1883, to L'Abbé Petitot, for his geographical and ethnological researches in the region of the great lakes of the Arctic Basin, between Great Slave Lake and the Polar Sea, and his map of the basin of the Mackenzie.

The Cuthbert Peek Grant for 1883, to F. C. Selous, in acknowledgment of the value of his geographical researches in South Central Africa, including a journey in 1877 through the Manica country, north of the Zambesi, published with a map in our 'Proceedings' (1881, p. 169), an examination of the hydrographical system of the Chobe ('Proceedings,' 1881, p. 71), and two journeys by previously untrodden routes through Mashona-land ('Proceedings,' 1881, p. 352, and 1883, May No.), carefully prepared maps of which he communicated to the Society. Also as an encouragement to him in the further researches in geography and natural history he has undertaken in the same region.

Presentation of the Public Schools' Prize Medals.*

The Medals had been awarded as follows by the Examiners, who were, for Physical Geography, Professor H. N. Moseley, M.A., F.R.S., and for Political Geography, General Sir J. H. Lefroy, R.A., K.C.M.G.; the special subject for the year being the Dominion of Canada.

Physical Geography.—*Gold Medal*—Thomas Rose, Dulwich College. *Silver Medal*—Samuel William Carruthers, Dulwich College. *Honourably Mentioned*—James Douglas Dallas, London International College; Edward George Stubbs, Liverpool College; Charles Alexander Maclean Pond, City of London School.

Political Geography.—*Gold Medal*—Sydney Charles Farlow, Harrow School. *Silver Medal*—Not awarded. *Honourably Mentioned*—Arthur Frank Bowker, University College School.

Mr. Francis Galton (Chairman of the Public Schools' Prizes Committee) stated that ten schools had sent candidates to the examination this year; seven of these sent eleven candidates in Physical Geography, and four sent six candidates

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* The other medals, for the promotion of Geographical Education, placed by the Society at the disposal of the syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1882. Oxford (June).—*Silver Medal*—Herbert William Horwill, Taunton. *Bronze Medal*—Frederick Wynne Lloyd, Liverpool.

Cambridge (December).—*Silver Medal*—(Physical Geography)—Katherine Mary Emery. *Silver Medal*—(Political Geography)—R. P. Smith, Leamington.

in Political Geography. This he was sorry to say was the smallest response they had as yet met with. No less than forty-eight schools were invited. The numbers fluctuated from year to year. For the first time no silver medal had been adjudged in Political Geography, the one candidate who deserved honourable mention hardly attaining the necessary level. Dulwich had won a medal every year since 1875. The Gold Medal in Political Geography had been awarded to a Harrow boy who obtained the silver medal last year.

General Sir HENRY LEFROY introduced the successful candidates to the President, who presented them with the medals.

The PRESIDENT announced that the special subject for examination in 1884 would be "India."

THE BALLOT.

Previous to taking the votes,

Sir HENRY RAWLINSON said it was certainly very honourable to the discernment and appreciation of character possessed by the Society, although it entailed some practical inconvenience, that it so often happened that when they selected a distinguished person to preside over them, Her Majesty's Government appointed the same individual to some important office of State. It had happened on three former occasions—in the cases of Lord Ripon, Lord Dufferin, and Lord Northbrook; and it now occurred again in the case of Lord Lansdowne. For the last three years Lord Aberdare had presided over their councils with singular vigour and ability, and to the manifest advantage of the interests of the Society, but he was now entitled to a respite from work, and it had been accordingly proposed to transfer his duties to Lord Lansdowne. Within the last week or ten days, however, the Government had signified its intention of confiding to Lord Lansdowne the honourable and responsible duties of the government of the Dominion of Canada; and under these circumstances he had been obliged to withdraw his acquiescence in this election as President; but it would be with a feeling of great satisfaction that the members would learn that Lord Aberdare had consented to continue in harness. During the past three years he had given such universal satisfaction by his genial bearing, his strict attention to the duties of the Society, his thorough business habits, and his extensive acquaintance with geographical subjects, that they would all appreciate at its full worth the obligation he now conferred upon them by consenting to continue the direction of their affairs. The Council was prepared to yield him, as it had always done, the most earnest and loyal support in the fulfilment of his duties, and he (Sir Henry) was authorised by them to recommend the nomination of Lord Aberdare as President. A subsidiary arrangement was thus facilitated, whereby they were able to appoint as Vice-President Mr. Francis Galton, one of the oldest supporters of the Society, whose services they would otherwise have temporarily lost.

The Scrutineers reported the result of the Ballot to be that the recommendations of the Council were adopted. The following is the list voted (the names printed in *italics* being new members, or those who change office).

President: Right Hon. Lord Aberdare, F.R.S. *Vice-Presidents:* Sir Rutherford Alcock, K.C.B.; Sir Barrow H. Ellis, K.C.S.I.; Right Hon. Sir H. Bartle E. Frere, Bart., G.C.B.; *Francis Galton, Esq.*, F.R.S.; General Sir J. H. Lefroy, R.A., K.C.M.G.; R. H. Major, Esq., F.S.A. *Treasurer:* Reginald T. Cocks, Esq. *Trustees:* Lord Houghton, D.C.L.; Sir John Lubbock, Bart., F.R.S. *Secretaries:* Clements R. Markham, Esq., C.B.; Douglas W. Freshfield, Esq. *Foreign Secretary:* Lord Arthur Russell, M.P. *Members of Council:* John Ball, Esq., F.R.S.; E. H. Bunbury, Esq.; Sir T. Fowell Buxton, Bart.; *Colonel J. U. Bateman Champain*, R.E.; *Major-*

General A. C. Cooke, R.E.; Right Hon. Lord Cottesloe; R. N. Cust, Esq.; James Fergusson, Esq., F.R.S.; Colonel J. A. Grant, C.B., C.S.I., F.R.S.; J. K. Laughton, Esq.; S. P. Low, Esq.; W. Mackinnon, Esq., C.I.E.; *Rear-Admiral R. C. Mayne*, C.B.; *Major-General Sir H. C. Rawlinson*, K.C.B.; Sir Rawson Rawson, K.C.M.G.; *Major-General C. P. Rigby*; General R. Strachey, R.E., C.S.I., F.R.S.; General Sir H. L. Thuillier, C.S.I.; *General Sir C. P. Beauchamp Walker*, K.C.B.; *Sir Allen Young*, C.B.; Colonel Henry Yule, C.B.

The PRESIDENT then read the Annual Address on the Progress of Geography.

Admiral Sir ERASMUS OMMANNEY proposed, and Captain PEACOCK seconded a vote of thanks to the retiring Members of Council, the Committee, Auditors, and Scrutineers.

The motion was unanimously agreed to, and the Meeting then separated.

THE ANNIVERSARY DINNER.

The customary dinner in celebration of the Anniversary Meeting took place at Willis's Rooms in the evening of the same day; Lord ABERDARE, President, in the Chair. 160 members and guests and friends sat down, among them the following:—

The Marquis of Lansdowne; the Earl of Northbrook; Lord Houghton; Mr. W. Spottiswoode (President of the Royal Society); Professor Huxley; Sir J. D. Hooker; Mr. E. Colborne Baber; the Hon. S. Ward, of New York; Colonel G. E. Church; Sir Bartle Frere; Sir H. C. Rawlinson; Sir Frederick Pollock; General Sir J. Hills; General Sir J. H. Lefroy; the Malagasy Ambassadors, Ravoninahitriniarivo and Ramaniraka; M. C. Boissevain; Dr. Emil Holub; Sir Fowell Buxton; General R. Strachey; Sir R. W. Rawson; Colonel Grant; General Rigby; Sir H. E. Thuillier; Admiral Sir Erasmus Ommanney; General Sir Beauchamp Walker; &c., &c.

The toasts were:—1. "Her Majesty the Queen, Patron of the Society;" 2. "The Prince of Wales, Vice-Patron, the Duke of Edinburgh, Hon. President, and the other members of the Royal Family;" 3. "The Medallists of the year." In proposing this toast, the President said there was no duty cast upon the Council of a more delicate character, and none performed with more conscientious care than the selection of those to whom they presented the Royal Medals. So great was the impartiality with which those medals had been bestowed, that he did not remember whether of late years the greater number of the recipients had been English or foreign travellers of distinction. On the present occasion the Council had come to the conclusion that they could not bestow them more worthily than upon the two distinguished gentlemen whose names were familiar to all—Sir Joseph Hooker and Mr. Colborne Baber.—In responding to the toast Sir Joseph Hooker, after touching upon some of the points referred to by the President, said that in looking over the list of medallists, he saw that the medals had been generally granted for great and distinguished discoveries and explorations, for what he might not unjustly call great geographical results. But as time went on, it appeared to him that the subject would be exhausted, and that even those meteoric showers of which astronomers talked would not enlarge the field for discovery rapidly enough to occupy an unending series of medallists. He had been reminded by Lord Lansdowne of a Royal Academy dinner when one of the best speeches of the occasion was made by Mr. Gladstone, who had to respond to literature, and gave it as his opinion that as the literature of the past might be called the literature of production, the literature of the future would be the literature of criticism. Some such distinction, he was inclined to think, might be applied to the subject with which this Society was concerned, and that, while the geography of the past had been characterised by discovery, the

geography of the future would be engaged with biological research. With regard to the bestowal of medals upon foreigners, he could not help saying that many of those foreigners had abounded in a kind of knowledge in which we had been all too deficient. Still, if he were asked of what nationality the geographers of the future would be, he should say that Englishmen would carry off the prize, and that the flag of England would be found floating at the peak of the Royal Geographical Society of London.—Mr. Colborne Baber also spoke in acknowledgment of the toast.

4. "Other Scientific Societies," proposed by the Marquis of Lansdowne. His Lordship said the very comprehensiveness gave the toast importance in his eyes. It was probably within the knowledge of some there that but for an event very much unforeseen by him he might have aspired to fill the Chair at present filled by his friend on the right, and he was convinced that when Lord Aberdare allowed him to propose this toast he did so from a wish to give him an opportunity of expressing his most sincere thanks to some of his friends who were ready to acquiesce in conferring upon him a distinction he had no right to expect. He need not say how much he coveted the honour of occupying a Chair which had been filled by such men as Murchison, Sir Bartle Frere, Sir Henry Rawlinson, Lord Ripon, Lord Northbrook, Lord Dufferin, and his friend Lord Aberdare. He felt some compensation for the loss he had sustained, however, in the reflection that if he had been allowed to fill the President's Chair the Society would have found before he had been many months in it that they had an incompetent President, while he should have found that he had undertaken a task too heavy. As it was, he might persuade himself that he was a sort of Marcellus of the Royal Geographical Society, and he was reminded of a passage in Virgil which Dryden translated—

> "This youth, the blissful vision of a day,
> The Fates just showed to earth, then snatched away."

Certainly any one who had been within measurable distance of the Chair of the Royal Geographical Society had no right to talk of himself as a youth, and he should not undertake to describe himself as a blissful vision; but there was a blissful vision—the vision he had enjoyed of the courtesy of the Royal Geographical Society and of their brilliant hospitality that evening, and he should carry away a very vivid recollection of the reception they had given his name, and of the readiness they had shown to confer upon him a great distinction. Having so far digressed into matters which concerned himself, he should now say a few words with regard to the toast he had to propose. Remarking that one of the things which had been deeply impressed upon his mind was the close alliance and inter-dependence of all branches of science, he pointed to the services to geographical science rendered by the distinguished botanist on his left (Sir Joseph Hooker), and observed that there was no Society more intimately connected with other scientific societies than this. With this toast he should join the names of the President of the Royal Society and of Professor Huxley.

Mr. W. Spottiswoode, in responding, observed, in reference to a remark made by Sir Joseph Hooker, on the possibility of the function of this Society ceasing, that if by geographical exploration was intended a series of great expeditions, the success of which had been as much due to the pluck and patience with which they had been conducted as to any preparation for the undertaking, then he must admit the function of the Society was finite; but if they meant an accurate delineation of the earth's surface, and an exact account of its inhabitants and their habits, of the animal and vegetable life and its distribution over the face of the globe, then the Royal Geographical Society had a long and brilliant career before it.

Professor Huxley expressed regret that he was no longer so intimately acquainted

with the affairs of those other kindred societies for which he was expected to respond. They were, from all he heard, exceedingly active, and he had no doubt that they were doing good work. He might venture to add that he thought those societies were all growing a little dull. He did not say this in way of reproach. The progress made in research and accuracy in methods of procedure involved that consequence. So long as there were large regions of knowledge which the methods of modern science had not penetrated, so long was it possible to go to meetings of societies, and to hold brilliant discussions. Looking at means which now existed for the diffusion of information, he had been led to think that in many cases where the field of knowledge had been extensively explored the utility of societies was constantly diminishing, and that sooner or later it would be necessary to devise other means of effecting the results now attained by meetings of societies. But there was one thing which would not be reached at any period of time by any other organisation than that of societies, and that was the stimulus which was given by their meetings to investigators; and the reward they found for their toils and sacrifices in such a welcome as had been given that night to his long-tried friend, Sir Joseph Hooker. There was a classification of mankind into two species, which, though it had little to recommend it, perhaps, to the scientific mind, was on moral grounds eminently acceptable. It was that there are two sorts of men—those with whom you can go tiger hunting and those with whom you cannot. Sir Joseph Hooker was a man with whom he had had many a tiger hunt, and whom they all trusted in enterprises of that kind.

The remaining toasts were: 5. "Our Foreign Visitors," proposed by Lord Northbrook, and responded to by M. C. Boissevain, of Amsterdam; 6. "Our President," proposed by Major-General Sir H. C. Rawlinson, and briefly acknowledged by Lord Aberdare.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—May 18th, 1883: M. Ant. D'Abbadie (of the Institute), President of the Central Commission, in the Chair.—M. Ferdinand de Lesseps, President of the Society, read a letter, which he had received quite recently from Rear-Admiral C. Fleuriot de Langle, grandson of Chevalier de Langle, the companion of La Pérouse in his celebrated expedition. De Langle was in command of *L'Astrolabe*, and La Pérouse of *La Boussole*. On December 11th, 1787, De Langle, who, in company with several of his companions had landed in a canoe, on the island of Manoua or Maouna, was massacred by the natives there; the island has been named the "Island of Massacre" from this tragic event. Thus La Pérouse was deprived of his experienced leader, who was in reality the naval chief of the expedition (although from modesty he had refused the chief command). Eventually La Pérouse perished, as every one knows. It was only in 1826 that the English Captain Dillon discovered in the Island of Vanikoro the remains of his two ships, with various articles belonging to them, which are now preserved in the Musée de la Marine, at the Louvre. These were the first tidings of the fate of this expedition, which perished by shipwreck. Although the remains of La Pérouse have not yet been recovered, those of De Langle and his companions have just been found, as announced by Admiral De Langle's letter, who has been informed of the discovery by Père Vidal, Superior of the Apostolic Mission of the Samoa Islands (Navigators' Archipelago). The French missionaries, who had been established but a short time in this group of islands, after making researches, have been successful in finding the remains of these unfortunate navigators at Tutuila (the Maouna of La Pérouse),

thanks to the information received from the natives, who at first persisted in keeping back the truth. A monument, together with an expiatory chapel, is going to be erected, under the direction of these missionaries, upon the exact spot of the massacre, and if the Admiral expresses any regret, it is that none of the four grandsons of the celebrated navigator, who are all sailors, should have had the good fortune to make this discovery in the course of their ocean voyages. The Admiral further states that he chose, as the medium of this communication to the Society, M. Ferdinand de Lesseps, nephew of the Lesseps who also accompanied La Pérouse, and whom the latter despatched to France across Siberia, to convey tidings of the expedition to Louis XVI., the king having himself drawn up its instructions. Some time after, when Louis XVI. was informed by Lesseps of the massacre of De Langle at Maouna, "Sir," answered the author of the 'Voyage de Sibérie,' "your expedition is lost!" Lesseps, as one of De Langle's sailors, knew his chief's great ability as a navigator.—The Geographical Union of the North of France, which has its seat at Douai, the town chosen last year at the Bordeaux Congress for the holding of the next Congress of the French Geographical Societies, announced that the 1883 meeting would be held from the 26th to the 31st of August, immediately after the Congress of the French Association for the Advancement of Science, which this year is also to meet in the town of Douai. A Geographical Exhibition, to which the Belgian, Dutch, and Scandinavian Societies have promised their assistance, will be opened during the meeting of the Congress. Among the projected excursions, is a visit to the submarine tunnel between France and England, now in course of construction.—It was stated on behalf of the Lyons Geographical Society, which has proposed to found a prize to be awarded by the united French Geographical Societies, that this prize will certainly not consist of a sum of money, but of a gold medal, which will be given every three years for the best French work on geography.—M. l'Abbé Lesserteur, Director of Foreign Missions at Paris, transmitted a sketch, which just completes Père Pinabel's work (received recently) on the uncivilised country comprised in the mountainous part of the province of Tagnehoa in Tong-king. This supplement will allow of an early insertion of the work in the quarterly *Bulletin*.—Dr. Harmand, Consul at Bangkok, sent an account of the works of M. Loftus, hydrographical engineer to His Majesty the King of Siam; he (M. Loftus) asks to be made a Corresponding Member of the Society.—M. Désiré Charnay quoted some passages from a chronicle written by an Indian cacique, who lived at the time of the conquest of Yucatan by the Spaniards: the chronicle is translated from the Maya language and published by M. Brinton (Philadelphia, 1882). M. Charnay finds in it confirmation of the thesis which he recently supported before the Society, viz. that the monuments of Yucatan and Mexico, to which such great antiquity is assigned, are much less ancient than is supposed. Some of these monuments, palaces, and temples were still standing and inhabited when the Spaniards arrived.—Captain Delanneau, attaché of the staff of the Commander-in-chief on the Upper Niger, wrote from Banmako or Bammako, on 6th of March, giving detailed information of this locality, which is the extreme point of navigation on the Upper Niger, the river being completely blocked there by the rocks of Soluba. The place, which is situated in the middle of a vast, but marshy, and often inundated plain, has lost much of its importance as a market since the time of Mungo Park, and even since the journey of Mage, the French traveller. The market has been transferred to Jamina and to Sego. It is still, however, a fairly important route for caravans, which come from Kaarta bringing from there salt to be exchanged for slaves. The Banmako country is composed of twenty-four villages, more or less important, inhabited by farmers and weavers; the former are by no means an ignorant race, having so many dealings with the passing

caravans just mentioned. Among the inhabitants the Bambaras especially are described as being industrious, intelligent, frugal, and brave; they are, moreover, the warlike race, and furnish the chiefs. With regard to the neighbouring empire, viz. that of Ahmadu at Sego, the correspondent says its influence is declining every day, and the power of its prince becoming weaker and weaker. According to Captain Delanneau, the distance from Banmako to Timbuctu would appear to be less than the maps represent, it being, as he says, from twenty to twenty-five days' march.—M. H. Duveyrier, who read this letter, stated that he had just received another, also from Africa, from which we learn (i.) That the Touaregs Azdjers having been plundered by the Hoggars, are organising an important expedition against the latter. (ii.) That during recent months rain has fallen twenty times in the Sahara (a very rare occurrence).—The Minister of Foreign Affairs communicated two letters received from M. Ledoulx, French Consul at Zanzibar, dated the 1st and 28th of March respectively. They contain news of M. V. Giraud, qualified midshipman of the French Navy, of M. G. Revoil, who is charged with a new mission to the Somali country (southern part) and also of Capt. Bloyet, as follows:—M. G. Revoil has, since 9th of January, been staying at Zanzibar, before setting out for the Somali country. He has been busy collecting in the island and its environs, the greatest possible number of botanical, zoological, ethnographical, and geological specimens, destined for the Natural History Museum at Paris. The fauna and flora of the island of Zanzibar are still only imperfectly known, very few explorers, except perhaps M. Grandidier, having exerted themselves in this direction. The island is indeed, for the majority of travellers, merely a halting-place before entering on the continent. Already several cases of specimens and objects, for the most part new, have been forwarded to France under the direction of the consul. Captain Bloyet, chief of the French station of Usagara, had just sent to the International African Association a copy of his journal, a collection of photographs, and an account of a journey made by him to Mamboia. M. V. Giraud had communicated satisfactory news, dated from Mgouna, the last town of Khutu (lat. S. 7° 27′, long. E. 34° 33′). He had only had a very few desertions from his caravan. There will be no more news of his movements in penetrating the interior, before the end of June. M. Ledoulx speaks also of the English geologist, Thomson, who had been staying at Zanzibar, and who had just set out for Mombas, where he starts on his exploration of the country of the Masai, and of Kilimanjaro. Dr. Fischer was proceeding to the same regions; the latter had great difficulty in recruiting his porters, who were by no means desirous of traversing the region inhabited by the cannibal tribe of the Masai; moreover, in order to make still more sure of the men composing his caravan, he had interested them commercially in his enterprise—a fresh mode of recruiting there, and disapproved of by Mr. Thomson, but it will be curious to see the results of it. The news of the death of Dr. Kayser, from the effects of a prolonged bath, is confirmed by M. Ledoulx, who also states that although the rumour of the death of king Mtesa had persistently spread along the coast, yet nothing had come to hand to corroborate it.—The General Secretary then read a letter received from an Egyptologist, M. Arthur Rohne, who complains loudly, and with good reason, of the works ordered by the corporation of Cairo for the so-called embellishment of the city, but which do not show sufficient regard for the precious monuments of ancient architecture. It was stated, moreover, that the English are equally excited at this profanation, and the archæologists of the British Museum have protested, while the press on the other side of the Channel has lifted up its voice to put a stop to these acts of vandalism.—In conclusion, a communication was made by M. A. Petiton, engineer of mines, on the geology of Indo-China. M. Petiton was chief engineer of mines in Cochin China from 1868-70 (see quarterly *Bulletin*).

——— June 1st, 1883: M. Ant. d'Abbadie, of the Institute, in the Chair. —M. Ferdinand de Lesseps announced that he had accepted the Honorary Presidentship of the Sixth Annual Congress of the French Geographical Societies, which is to be held this year at Douai, and that he would attend the Congress. —M. A. P. d'Azevedo, Portuguese General of Engineers, transmitted a copy of his geo-hydrographical map of Porto-Santo, and also his map of the eastern part of the island of Madeira; the map of the western half will be published before the end of the year.—M. Rich. Cortambert presented two large maps of Japan, in the Japanese language, which have been sent to the Society by the Geographical Society of Tokio. He stated at the same time that M. Oukawa, one of the founders of the latter Society, who is very well versed in the French language (he has given lectures in French at Tokio), had just been appointed chief secretary to the Japanese Legation at Paris. M. Oukawa requests to be made a member of the Geographical Society of Paris, and purposes to appear shortly before the Society and to give some information on the actual state of the Empire of the Rising Sun. These different maps were exhibited in the hall, as well as a very fine one of Madagascar by the Rev. Dr. Mullens, presented by the London Missionary Society. In connection with this island, M. Romanet du Caillaud sent a short communication, entitled "French Rights in Madagascar."—The Society received through the Minister for Foreign Affairs a report, dated April 25th, 1883, by M. Ledoulx, French Consul at Zanzibar, on the explorers and missionaries engaged at the present time in the East of Africa. The report states that the Uganda mission had been abandoned, but that, to compensate for this, the missions of Tabora, Usanza, M'rogoro, &c., were meeting with success. No news had arrived of M. Thomson or of Dr. Fischer. Captain Bloyet had completed his map of Usagara, while M. G. Revoil was preparing to start for Mogadoxo, having chosen this place as his point of departure; from there it is his intention to proceed to Gualidi and thence to reach Gananeh, to determine this place accurately, and afterwards to study the course of the Jub. He will then, having retraced his steps to the west, reach the great tribe of the Ugadines, on the banks of the Uébi. Should he be able to accomplish this, he will push still further west. He purposes to return by the Harrar and finish at Zeylah, on the Gulf of Aden.—A letter from M. Revoil, dated the same day (April 25th) from Zanzibar, confirms the consul's statements as to his movements.—Another communication was received through the Minister for Foreign Affairs, viz. a report, dated January 4th, by Dr. Neïs, naval physician, on his journey from Kratieh to Stung-Treng in Laos. This latter place is a large village of some 2000 inhabitants, which extends along the Secong. It contains 200 houses, many of which are doubled; that is, connected with each other by means of a platform made of twisted bamboos. The traveller stayed there about a week in order to be able to give an account of the resources of the country, its system of exchange, the conditions of its commerce, and also to visit the ruins there, which have been already described by the Doudart de la Grée expedition. The place is inhabited by the Laotians and the Chinese. Unfortunately, among the articles of commerce, must be mentioned the sale of slaves. A young man or girl (generally of the Mois) is worth there 50 piastres, and an aged man 20. Bands of from five to six Laotians, assisted by Chinese, and armed with guns, go off in this way to hunt human beings.—A letter, which had been received through the French Chargé d'Affaires at Montevideo, was read. This letter is written by a Bolivian Senator and concerns the place where the remains of Dr. Crevaux will be found. By the direction of the Society, the letter was communicated previously to the Parisian press, and it will be found reproduced in almost all the daily papers of the week.—It was announced that, on the 3rd of June, a Geographical Exhibition would be opened at

Brest, organised under the direction of the Academical Society of that town, through which the Society received the announcement of it. The promoters of the undertaking have thought that Brest, from its character and from the many valuable and curious objects which have accumulated there during two centuries of navigation and been preserved in old maritime families, would offer peculiar advantages for an exhibition of this nature. Each day during the holding of the exhibition there will be a lecture on geography.—General Venukoff sent a communication in which he announces, first of all, the recent departure for China of M. Potanine, who is going to explore the province of Kan-su, as well as the adjacent parts of Mongolia. He will have for a companion M. Scassy, a topographer already well known by his works on the mountains of Pamir. When first announced, the expedition was very modest in scale, but it has now assumed larger proportions, since a young and wealthy proprietor of gold-mines in Siberia, M. Soukatcheff, has placed 20,000 roubles at the disposition of the travellers. The letter goes on to say that over the whole length of the steppe between Chardjui and Uzboi, which has just been explored, no trace of the ancient bed of the Oxus can be found; that which three years ago was taken to be it by a Russian explorer, is only a plain, bounded in the north by the heights, but stretching away to the south without any well-determined limits. M. Venukoff further announces that the new frontier between Russia and Persia, from the Caspian Sea to the banks of the Héri-rud, will soon be defined, the topographical work having been completed between North Khorassan and South Turcomania. With regard to the Chino-Russian frontier in Dzungaria, he states that it will also be determined this summer. A considerable part of Upper Irtish having been annexed to Russia, it has been necessary to define this new acquisition.—From Washington Professor J E. Nourse announces the early publication of the work, commenced by him under the orders of the American Government, and then continued by some one else, on the schemes for cutting a canal through the continent of America. The same correspondent states that he will shortly publish another of his works on American expeditions to the North Pole.—In conclusion, M. Ch. Rabot spoke upon the recent Danish expeditions to Greenland, with reference to Nordenskiöld's voyage, and exhibited some photographic views.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Baddeley, M. J. B.—Thorough Guide Series. The Northern Highlands and Islands, containing a full description of Inverness, Loch Maree, and Gairloch, and of the whole Mainland north of those places in the Counties of Inverness, Ross, Cromarty, Sutherland, and Caithness; and also of the Orkney and Shetland Islands, and the district of Forres, Elgin, Nairn, and Spey-side, together with the approaches from Edinburgh, Glasgow, and Aberdeen. London (Dulau): 1883, 12mo., pp. xxviii. & 168, maps. Price 4*s*.

The maps, by Bartholomew, are an Index and a General Route map, and 13 sectional maps in coloured contour lines, compiled for the most part from the recent completion of the one-inch Ordnance Survey. A general description and a table of heights are given.

Tudor, J. R.—The Orkneys and Shetland; their past and present state. London (Stanford), Kirkwall (Peace), and Lerwick (Sandison): 1883, 8vo., pp. xxix. & 703, maps, plans, and illustrations. Price 1*l.* 1*s.*

Historical and archæological matters inevitably occupy a considerable portion of a volume like the present, but the author has, in addition to his own topographical observations, inserted chapters by Mr. B. N. Peach and Mr. J. Horne on the Geology of the islands, by Mr. W. J. Fortescue on the Flora of the Orkneys, and Mr. P. White on the Flora of Shetland. Various notes on natural history subjects by the author are also inserted, and he has paid much attention to the fisheries and other industries of the inhabitants in past and present times. The average monthly and yearly temperature and rainfall, population, local names, and various other supplementary matters are given as Appendices.

The maps are an orographical sketch of the Orkneys and Shetland, coloured geological and topographical maps of the Orkneys and Shetland (separately), and maps of Fair Isle, Lerwick, Papa Stour, and Foula. Some plans and 30 well-executed engravings illustrate the work.

ASIA.

Prjevalsky, N.—Tretye Puteshestvie v Centralnoi Asii. Iz Zaisana cherez Khami v Tibet i na verkhovya Joltoi Raki. [Third Journey to Central Asia. From Zaisan viâ Hami to Tibet and the head-waters of the Yellow River.] St. Petersburg (V. S. Balashof, printed for the Imperial Russian Geographical Society): 1883, 4to., pp. i.–iv., i., ii., 1–476 [no index], maps, plates, and woodcuts.

Col. Prjevalsky's start early in February 1879, on his third Tibetan expedition, of which the details are given (entirely in Russian) in the volume above referred to, was chronicled in our 'Proceedings' for that year, p. 208. His subsequent movements are noticed at p. 384 of that volume, and pp. 312, 566, and 697–700 of the following one, containing the outline of his journey from the Post Zaisan to Sa-chau (Shachau, the Sachiu of Marco Polo) on the road to Lhassa, which he was not allowed to reach, being turned back at the village of Napchu, 180 miles from the capital, his subsequent return march to Sining (the centre of the rhubarb district) and his visit to the upper Hoang-ho.

The profusely illustrated and portly volume now published is divided into 18 chapters, of which Chapter I. describes the equipment of the expedition at Zaisan and the journey through Dzungaria by the valley of the Urungu; II., the route from the Altai to the Thian Shan; III., from Barkul to Hami; IV., the oasis and desert of Hami; V., the oasis of Sa-chau and spurs of the Nan-Shan range; VI. and VII., the latter range and the stay made in it by the author and his party; VIII., Tsaidam; IX., X., and XI., Northern Tibet and the route taken through it; XII., the halt near Mount Bumzà; XIII., the return to Tsaidam; XIV., from Tsaidam to Koko-nor and Sining; XV. and XVI., the exploration of the upper-waters of the Hoang-ho; XVII., a visit in summer to Koko-nor, and second exploration of the eastern Nan-Shan (Kan-su); XVIII., the route followed across the Ala-shan and Central Gobi.

The large and well-executed map is divided into two sections, and shows the author's second journey to Lob-nor in 1876 and 1877 as well as the present. The plates are from sketches by Roborofsky, one of the expedition; and in addition to merely personal incidents, represent various ethnographical, zoological, and botanical subjects (all of which are copiously discussed in the text). Those of geographical interest are as follows:—View of Hami from the north; the Desert of Hami; sandstorm in the desert; the oasis of Sa-chau; hillocks of drift-sand from the south of the oasis; one of the glaciers of the southern slope of the Humboldt range; hillocks of friable löss-like clay and sand formed in the desert round the roots of tamarisk and kharmik (a species of *Nitraria*), causing considerable alteration in the elevation of the surface where those plants are thick; different forms of whirlwinds; a general view of the saline plains of southern Tsaidam;

the central part of the Burkhan Buddha range, from the Baian-gol river in Tsaidam; the defile of the Nomokhan-gol river in the last-mentioned range; the Shuga mountains, Northern Tibet; an "Obo" or cairn-like erection in the pass across Tang-la; winter view of Koko-nor from the south; the Hoang-ho near Balekun-Homi; cliffs of the Hoang-ho near the mouth of the Churmyn; the oasis of Gui-dui; Koko-nor from the north shore; the temple of Chobseng; pass of the river Tatung-gol in the mountains near the temple of Chertinton, and the temple itself; the Central Gobi; and the sands of Tingeri. There is also a view of the town of Urga from a photograph.

AFRICA.

Rivoyre, Denis de.—Obock, Mascate, Bouchire, Bassorah. Paris (Plon): 1883, 12mo., pp. 292, map, and illustrations [no index]. (*Dulau*: price 4*s.*)

The author (who has already published a work on his explorations of the Abyssinian coast) started in August 1880, for a renewed visit to the place first mentioned in the above title, from which he proceeded to well known points in the Persian Gulf.

Obock or Obokh is on the East African coast, nearly on the 12th northern parallel, on the north side of the Gulf of Tajura, in the Danakil country, near the mouth of the Strait of Bab-el-Mandeb. It is about 120 miles west of Aden, and 45 miles north of Zeila, and represents a territory of about 25 square leagues acquired by the French Government in March 1862 by purchase of the native chiefs who owned the land, with the object of establishing a coaling station for their vessels, which are still compelled (as M. de Rivoyre says) to demand of the English at Aden or Galle a "precarious and jealous hospitality." Nothing, in fact, has been accomplished towards the foundation of a depôt so necessary for French interests in view of their colonial extensions in Tong-king; "in other hands," the author says, "there would have been time for the erection and extension of a town," but from his account the place is only used by neighbouring tribes for the purpose of feeding their flocks, and by Arab boatmen. M. de Rivoyre describes his own explorations of this uninteresting territory, which he soon left, not however before receiving a visit from the first French colonist, a speculator who had been induced to come to Obock by the representations of a French commercial company, whose prospectus offered gold-mines there, among other attractions.

The map shows the author's route, and the illustrations represent the environs of Zeila, the shore of Obock, Mascat, Basrah, Filieh, Muhamrah, the ruins of the Mosque of Ali, Zuber, &c.

Robert, Fritz.—Afrika als Handelsgebiet. West-, Süd-, und Ost-Afrika. Wien (Carl Gerold's Sohn): 1883, 8vo., pp. 350 [no index].

The author quotes the best official and other sources of information bearing on the subject of African trade, and divides his subject into a general part (in which he sketches the connection with West, South, and East Africa, of the five European powers possessing colonies there, and of the seven others which, with no colonies of their own, have commercial relations with the continent), and a special part in which twenty-nine different localities are discussed as regards their trade capabilities. Trade customs and the varying unit of exchange are also discussed, with the means of communication with Europe and internal routes, &c. The Portuguese, French, and English Colonies, the Transvaal, the Hamburg trade, &c., are separately referred to statistically in an appendix, which also gives costs of carriage of goods by different routes.

AMERICA.

Stanford's Compendium of Geography and Travel, based on Hellwald's 'Die Erde und ihre Völker.' North America, edited and enlarged by Professor F. V. Hayden, late Chief of the United States Geological Survey, and Professor A. R. C. Selwyn, F.R.S., Director of the Geological Survey of Canada. London

(E. Stanford): 1883, post 8vo., pp. xvi. and 652, maps and illustrations. Price 21*s.*

The official positions of the editors of the present volume sufficiently indicate an attention to physical points in treating their subject, which is divided into two parts, the States occupying 285 pages, and the Dominion 351.

The maps are :—Physical of the whole area; geological, population, rainfall, and greatest heat and cold of the States as a whole, and political of the Eastern and Western States, with a separate map of the Yellowstone National Park; the Dominion, Manitoba, British Columbia, and Saskatchewan, Railway map, Route map, Canada, and Newfoundland. The ethnological appendix is not repeated.

AUSTRALASIA.

Powell, Wilfred.—Wanderings in a Wild Country; or, Three Years amongst the Cannibals of New Britain. London (Sampson Low & Co.): 1883, 8vo., pp. vii. and 283 [no index], map and illustrations. Price 18*s.*

Mr. Powell's explorations in New Britain and the neighbouring islands were first made public in August 1880, at the Swansea meeting of the British Association, recorded in our 'Proceedings' for that year, p. 645. In the following volume, he contributed a paper on the same subject (pp. 84–97), illustrated by a sketch survey map of the north-east portion of New Britain, which is reproduced in the present book; and on May 7th last he read a paper before this Society in which some more of his experiences (especially in connection with the New Guinea coast) were narrated.

The volume now published contains further details, interesting to anthropologists as well as geographers. Starting in June 1877 from Sydney, the author sailed inside the great north-east Australian Barrier reef, visiting Lizard island, and striking N.E. by Cook's passage to the Brumer islands, a part of the numerous groups at the south-eastern apex of New Guinea,— soon finding ample opportunity for correcting the Admiralty Charts in important respects. Mr. Powell, however, observes that shoals and reefs rise so rapidly here that it by no means follows there was any error in the original observations on which these charts were laid down. He is also at the same time convinced that there are hundreds if not thousands of islands in the Pacific never seen by white men save in the distance, and many, he has little doubt, never seen at all. In one place, a dubiously reported "rock" was found, 60 miles out of position, and represented by twenty-one inhabited islands.

After calling at Teste, Basilisk, and Hayter Islands, among others, Mr. Powell sailed to the east of the D'Entrecasteaux group, striking north past Trobriand Island to the channel between New Britain and New Ireland, and landing on Matupi, thence visiting Ulu, Utuan, and the main island of the Duke of York group. Explorations were then made among the bays and islands of the north-eastern portion of New Britain, the volcanic phenomena of which appear very extraordinary; but the hostility of the natives could not be overcome, and in the end the author was glad to return with his life, having lost nearly all his collections. He had, however, luckily sent off a large collection of ethnological objects to Sydney before leaving the islands, and his observations, log sketches, and field books have enabled him to put together a volume of great interest.

Some notes on New Ireland, the numeral system of New Britain (a primitive form shown to have some analogy with the Roman figures), and a slight vocabulary are given with other matter in the appendix.

GENERAL.

Bellemo, Vincenzo.—I Viaggi di Nicolò de' Conti riscontrati ed illustrati con Proemio storico, Documenti originali e Carte geografiche. Milano (Brigola): [1883], post 8vo., pp. 336, maps. Price 3*s.*

After a discussion of the available evidence, Signor Bellemo agrees with Bullo's conclusion that the illustrious traveller was not a Venetian, but born in

Chioggia, and points out that the error has occurred through the term "Veneto" used by Poggio and Piccolomini, and which applies to the whole territory between the Isonzo and the Mincio from E. to W., and the Alps and the Po from N. to S., being wrongly interpreted in the restricted sense of "Veneziano," —the name "Venezia" in fact not coming into use until after the 13th century, replacing the old "Rivoalto."

Poggio's introduction is reproduced, and his text is illustrated by a few short notes, and increased by some intercalations and a concluding chapter, the chief value being in pp. 273–330, which contain various quotations and elucidatory references.

A map shows the whole route of Nicolò de' Conti from Venice to Alexandria, Aleppo, Angora, Samarcand, Damascus, Bagdad, down the Persian Gulf, Hindostan, Sumatra, Burma, China, Borneo, Java, and Banda, returning by Borneo, Cochin China, Ceylon, the Red Sea, and Spain; and another map on a larger scale gives the Hindostan routes.

Bettencourt, E. A. de.—Descobrimentos, Guerras, e Conquistas dos Portuguezes em terras do Ultramar nos seculos xv. e xvi. Lisboa (Matta): 1881–1882, pp. xvi. and 420, maps. (*Quaritch*: price 1*l.* 8*s.*)

Lithographed from the author's autographic imitation of ancient MS., with ornamental margins to each page, this curious volume is intended to popularise the history of the Discoveries, Wars, and Conquests of the Portuguese beyond the seas in the 15th and 16th centuries, commencing with the conquest of Ceuta in 1415 and ending with the Indian Viceroyalty of Francisco Da Gama in 1597. The maps consist of a planisphere showing the chief discoveries of the Portuguese in the whole world during the period named (including Australia, claimed to be known to that nation before 1525), a facsimile of one of the maps of the Atlas of Lazaro Luiz showing the Labrador coast, and a comparison of part of the Catalan chart of 1375 with the known position, &c., of the Azores, discovered subsequently to the date of that chart.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Attika, Karten von——. Auf Veranlassung des Kaiserlich Deutschen Archäologischen Instituts und mit Unterstützung des Königlich Preussischen Ministeriums der Geistlichen, Unterrichts- und Medicinal-Angelegenheiten. Aufgenommen durch Offiziere und Beamte des k. Preussischen Grossen Generalstabes, mit erläuterndem Text herausgegeben von E. Curtius und J. A. Kaupert. Heft II. Vier Blätter, Massstab 1 : 25,000 or 2·9 inches to a geographical mile :—

Bl. III. Athen—Peiraieus. Aufgenommen und gezeichnet von G. v. Alten und J. A. Kaupert.

Bl. IV. Athen—Hymettos. Aufgenommen und gezeichnet von Steffen und J. A. Kaupert.

Bl. V. Kephisia. Aufgenommen und gezeichnet von G. v. Alten.

Bl. VI. Pyrgos. Aufgenommen und gezeichnet von Siemens.

Berlin : Dietrich Reimer, 1883. (*Dulau.*)

These are very beautifully executed maps; the hill-work, which is shown by combination of hatching and contour lines, is coloured in sepia; the ancient names and positions are marked in red, the heights of the mountains, and the depths of the sea, as far as the ten-fathom line, are given in metres, the contours of the hills being for differences of 20 metres in level, and the lines of soundings commence at 2 metres, and are given for every change of 2 metres up to 20. These four sheets are accompanied by explanatory letterpress.

France.—Carte de France, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, Hachette et Cie., 1882–3. Sheets:—XI.—14, Domfront; XI.—15, Mayenne; XI.—16, Evron; XI.—17, Sablé; XI.—19, Angers; XII.—14, Argentan; XII.—22, Poitiers (Ouest); XIII.—11, Pont-Audemer; XIII.—21, Châtellerault; XIII.—22, Poitiers (Est); XIV.—14, Verneuil; XIV.—15, Illiers; XIV.—16, Châteaudun; XV.—15, Chartres; XX.—14, Arcis-sur-Aube; XXI.—12, Suippes; XXI.—14, Vitry-le-François; XXII.—12, Ste. Ménehould; XXII.—13; Bar-le-Duc; XXII.—14, Saint-Dizier; XXIII.—12, Verdun; XXIII.—15, Neufchâteau; XXIII.—17, Langres (Est). Price 7*d.* each sheet. (*Dulau.*)

Hamburg Altona, Plan von——, mit Ansichten der hervorragenden Baulichkeiten. Gezeichnet von Otto Maasch, Hamburg u. Leipzig, 1882. Verlag von Leopold Voos. Price 1*s.* 6*d.* (*Dulau.*)

Harzgebirge, Karte vom——, nach eine Relief von L. Deichmann. Scale 1:200,000 or 2·7 geographical miles to an inch. L. Deichmann, Kassel. Price 1*s.* (*Dulau.*)

Mittel-Italien, Hypsometrische Karte von——. Entworfen und gezeichnet im Landesbeschreibungs-Bureau der k. k. Generalstabes. Scale 1:750,000 or 10·3 geographical miles to an inch. Wien. Price 4*s.* (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie, Specialkarte der——. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut, Wien, 1883. Sheets:—Zone 5, Col. IX. Podersam und Rakonitz. Zone 6, Col. IX. Kralowitz und Břas. Zone 7, Col. IX. Pilsen und Blowitz. Zone 7, Col. X. Přibram und Mirowitz. Zone 8, Col. IX. Nepomuk und Horaˇdiowitz. Zone 8, Col. X. Pisek und Blatna. Zone 8, Col. XI. Tábor. Zone 9, Col. X. Protiwin und Prachatitz. Zone 16, Col. XVI. Sárvár, Kis-Cell und Beled. Zone 21, Col. XIV. Krapina und Zlatar. Zone 21, Col. XV. Kopreinitz und Kreuz. Zone 22, Col. XVI. Belovar und Grdjevac Veliki. Zone 22, Col. XVII. Barcs und Virovitica. Zone 23, Col. XIII. Jaska. Zone 23, Col. XVI. Darwar. Zone 24, Col. XI. Fiume und Delnice. Zone 24, Col. XVI. Pakrac und Jasenovac an der Save. Zone 24, Col. XIX. Djakovo und Vinkovci. Zone 25, Col. X. Pisino und Fianona. Zone 25, Col. XII. Brinje, Ledenica und Oštaria. Zone 26, Col. X. Pola und Lubenizze. Zone 27, Col. X. Unie und Sansego. Price 1*s.* 4*d.* each sheet. (*Dulau.*)

Schweiz, Neue Karte der——, von R. Leuzinger. Scale 1:400,000 or 5·5 geographical miles to an inch. Ausgabe 1883. Bern, Dalp. Price 4*s.* (*Dulau.*)

Wichmann, E. H.—Map of Great Britain and Ireland designed by E. H. Wichmann. Scale 1:915,000 or 12·5 geographical miles to an inch. Printed by Mühlmeister, Johler & Brauns, Hamburg. Price 21*s.* (*Williams & Norgate.*)

This map is coloured orographically, and is accompanied by two indices, one geographically and another alphabetically arranged. This latter is intended to assist the student in finding any place on the map, when used in combination with a measuring tape, on which are marked divisions bearing a proportion to the projection of the map, and which is fastened to the N.E. corner. The manner in which this is used is as follows: on reference to the index for the place required, a certain number of degrees and minutes will be found to stand opposite to it, and also an index number; the tape has to be stretched to cross the map until its upper edge rests on the degree and minute found in the index and then opposite to the index number on the tape will be found the place sought. In many cases, however, as the name of the town or village occupies a

length of 10 miles, according to the scale of the map, and as the names in some instances are midway between the town-marks, only a very rough idea of the situation of some of the towns can be formed; this, it is to be hoped, will be rectified in any future edition which may be published.

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 30th April, 1883.

6-inch—County Maps:—

ENGLAND AND WALES: Berks, sheet 23 with Buckingham sheet 51, and Oxford, sheet 54. Price 2*s.* 6*d.* Glamorgan, sheets 1, 4. Price 2*s.* each. Cornwall, Quarter Sheet, 73 N.W. Price 1*s.* Derby, Quarter Sheets, 9 N.E., 9 N.W. (these complete sheet 9); 11 N.W., 11 N.E., 11 S.E. (these complete sheet 11); 15 N.W.; 15 N.E.; 17 S.E.; 19 N.W.; 22 N.W.; 22 N.E.; 24 N.E.; 24 S.E.; 25 S.E. Price 1*s.* each. Shropshire, Quarter Sheets, 39 N.E.; 48 S.E.; 48 S.W.; 49 S.E.; 51 N.E. (1st edition, without contours). Price 1*s.* each.

IRELAND: Longford (revised) Sheet 24. Price 2*s.*

25-inch—Parish Maps:—

ENGLAND: **Derby**: Barrow upon Trent, 10 sheets. **Leicester**: Isley Walton, 4; Langley Priory, 3. **Monmouth**: Llangattock-Lingoed, 6, and Area Book; Llangstone, 5; Magor, 10; Skenfreth, 12. **Norfolk**: Barnham Broom, 7; East Tuddenham, 6; Little Ellingham, 6; Morley St. Botolph, 7; Morley St. Peter, 5. **Shropshire**: Badger, 6; Church Pulverbatch, 9. **Wilts**: Ashley, 4, and Ar. Bk.

Town Plans—

ENGLAND: Dudley, Scale 1:500. 18 Sheets.

IRELAND: Kinsale, 5-feet scale. 8 sheets.

ASIA.

Arabia Petræa, Reconnaissance of——, made by the Palmer Search Expedition under the direction of Colonel C. Warren, C.M.G. Scale 1:633,600 or 8·6 geographical miles to an inch. Compiled for the Lords Commissioners of the Admiralty. 1883.

Asien.—Physikalischen Wandkarten——, von H. Kiepert. Scale 1:4,000,000 or 55·5 geographical miles to an inch. 9 sheets. 3rd edition. Berlin, D. Reimer. Price 12*s.* (*Dulau.*)

Cochinchine et Tonkin.—Carte de l'Indo-Chine. Scale 1:5,000,000 or 66·6 geographical miles to an inch. Paris. Price 6*d.* (*Dulau.*)

Palaestina, Neue Wandkarte von——, von H. Kiepert. Scale 1:800,000 or 10·9 geographical miles to an inch. Berlin, D. Reimer. Price 1*s.* (*Dulau.*)

Wady Sudr, Reconnaissance Sketch of a portion of——, Arabia Petræa, made under the direction of Colonel C. Warren, C.M.G., R.E., for the Lords Commissioners of the Admiralty. Scale 1:63,360 or 0·86 geographical miles to an inch.

AFRICA.

Afrique, La Carte d'——. Scale 1:2,000,000 or 27 geographical miles to an inch. Sheets:—No. 16, St. Louis. No. 17, Timbouctou. No. 23, Free Town. No. 24, Ségou Sikoro. No. 31, Monrovia. No. 32, Koumassi. Dépôt de la Guerre, Paris, 1882–3.

This is the second issue of 6 sheets of a map of Africa which is at present being compiled by Capitaine R. de Lannoy de Bissy, and published by the Dépôt de la Guerre.

The sheets previously published are those of South Africa, and embrace all that portion south of the twentieth parallel of S. latitude. The present issue has reference to the Western portion of the continent, and includes the country between Cape Blanco and Elmina extending into the interior to Timbuctu and beyond Sego to the fifth meridian of west longitude.

This important map was commenced in 1875 by Capitaine R. de Lannoy, and its publication was undertaken by the French War Department in 1881; when complete, it will be composed of 60 sheets, in addition to which, there will be small maps of the Islands of Ascension and St. Helena, and special detailed plans of the principal towns, ports, and remarkable places. It is drawn on an orthographic projection, the parallels of latitude being represented by right lines and the meridians by elliptical arcs. Sheet 16 exhibits the coast from Cape Blanco to Cape Verde, and includes the colony of Senegal, and the course of the river of that name from St. Louis to Mediné; the tribal boundaries are laid down as well as the routes traversed by many explorers; indeed, this remark will equally apply to the map as a whole. This sheet contains more detail than any map of the same scale that has hitherto been published, and has also an inset map on an enlarged scale of the Environs of St. Louis.

The northern portion of sheet 17 is occupied by the desert of El Juf and the western portion of the country of the Tuaregs; on the southern portion is shown El Hodh, the north of Kaarta, Bambara, Masina, and the country surrounding Timbuctu; numerous remarks as to the nature of the country, and the sites of towns, &c., are inserted, especially in the country surrounding Timbuctu, and throughout the whole of Masina. Sheet 23 gives the coast-line from a little south of Cape Verde, to Sherbar, south of Sherboro Island; its eastern limit extends to Mediné, Timbo, and the western portion of the Republic of Liberia; it includes the English colonies of the Gambia and Sierra Leone, and the French establishments of Cazamanza, Boké and Mallecory, the Portuguese possessions in Guinea, and numerous tribal boundaries. The approximate areas of the territories which have been acquired by treaty by the Republic of Liberia, are shown by dotted lines, together with the date when each acquisition was made. Enlarged plans of towns and places of special interest are given on inset maps. Sheet 24 contains the basins of the Upper Niger and Upper Senegal rivers, and extends southward as far as the northern borders of Ashanti; in the south-west corner of this sheet is shown the country visited by Benjamin Anderson in 1868, a considerable portion of which, in the vicinity of Musardu, is laid down as having been ceded by the Western Mandingoes to the Republic of Liberia in 1868–69; and farther south the country of the Barline, according to this map, would appear to have also been ceded to the Republic of Liberia in 1874. Though there may doubtless be very good authority for extending the boundaries of Liberia in this direction, it is nevertheless a fact, that, in the recent publications of Kiepert, Justus Perthes, and others, this enlargement of the Republic has not been laid down. The positions of the advanced French military stations Bafulabé and Kita are given, the latter being not quite 90 geographical miles from Bammako at the head of the navigation of the Niger. Sheet 31 contains that portion of the territory of the Republic of Liberia between Gallinas and Point Bassa, extending into the interior as far as Bamboo town; this comprises the whole of the country of Montserrado. On an inset map is given the embouchure of the St. Paul River, which is taken from the United States Chart, and is on an enlarged scale. Sheet 32 contains the counties of Bassa, Sinon and Maryland, in the Republic of Liberia, and portions of the English colonies on the Gold Coast, and of the Kingdom of Ashanti. Each issue of six sheets is accompanied by a pamphlet in which is given all the authorities used in the compilation, and some general notes as to the people and topography of the country. The sheets at present published are photozincographs, and drawn in outline only; but it is intended that the chromolithograph edition shall be an orographic map.

The central meridian of the projection corresponds with the tenth degree of longitude east of Paris; this has been done in order to give a greater degree of accuracy to that part of Africa north of the Equator, as this meridian (which

corresponds to 12° 20′ east of Greenwich) is mid-way between Cape Verde on the west and Tajurra on the east, and thus divides Equatorial Africa into two equal parts. Somali Land, which would be outside this division, would indeed suffer some distortion; but as our acquaintance with the topography of this region is at present very slight and hypothetical, any distortion that may exist would not be perceptible; this remark, however, must not be taken to include the coast-line, as any distortion in that direction is a very serious consideration, as it is on the accuracy of some fixed position on the coast that the explorer, in most cases, bases his surveys of the interior of such little-known countries as Somali Land. The scale on which this map is constructed, affords great facility for the measurement of distances, if the metric system is used, as one millimètre corresponds to two kilomètres, a fact easily remembered, and which will enable distances to be measured with any scale graduated on the metric system. The present issue is a very valuable addition to the cartography of West Africa.

South Africa, Map of——, by T. B. Johnston. Scale 1 : 3,817,440 or 52·3 geographical miles to an inch. With Index. W. & A. K. Johnston, Edinburgh & London, 1883. Price 4*s.* 6*d.*

This is sheet 39* of the last edition of Johnston's well-known Royal Atlas. It has been brought up to date, and all railways and provincial boundaries of the Cape Colony have been inserted; the colouring of these latter is, however, somewhat confusing, as we find that the boundaries of the electoral divisions of the North-Western and South-Eastern provinces are coloured yellow, and so are the boundaries of the Orange Free State; again, the boundaries of the Transvaal are coloured green, and this also indicates the electoral divisions of the Western and the Midland provinces of the Cape Colony. With this exception, it is a very good map, on a sufficiently large scale to be useful to those visiting the Cape, and its value is greatly increased by the alphabetical index which accompanies it. The map folds up to a convenient size, and could readily be carried in the pocket.

Tunis, Umgebung von——, Porto Farina und Biserta. Scale 1 : 600,000 or 8·1 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883. Seite 162. (*Dulau.*)

Tunis et Carthage, Environs de——, levés et exécutés par MM. Derrien, Koszutski, Berthaut, Hugot-Derville, sous la direction du Commandant Perrier en 1878. Dépôt de la Guerre, Paris. (*Dulau.*)

AMERICA.

Assiniboia, Map of part of the District of——, North-West Territories of the Dominion of Canada, showing Dominion Lands surveyed to 31st December, 1882. Scale 1 : 390,000 or 5·2 geographical miles to an inch. Dominion Lands Office, Department of the Interior, Ottawa, 25th January, 1883, Lindsay Russell, Surveyor General. Published by authority of the Honourable the Minister of the Interior.

——— **and Alberta,** Maps of part of the Districts of——. North-West Territories of the Dominion of Canada; showing Dominion Land surveys to 31st December, 1882. Dominion Lands Office, Department of the Interior, Ottawa, February 20th, 1883, Lindsay Russell, Surveyor General. Published by authority of the Honourable the Minister of the Interior.

Colombia, F. v. Schenck's Reisen in——, Blatt II.: Routen von Medellin nach Manizales und Honda. Scale 1 : 450,000 or 6·2 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 7. Justus Perthes, Gotha. (*Dulau.*)

North-West Territories, General Map of part of the——, including the Province of Manitoba, showing Dominion Land Surveys to 31st December, 1882; additions and corrections to 15th March, 1883. Scale 1 : 2,450,000 or 33·5 geographical miles to an inch. Dominion Lands Office, Department of the Interior, Ottawa, Lindsay Russell, Surveyor General. Compiled and drawn by J. Johnston.

This is one of the series of maps which is published by order of the Rt. Hon. Sir J. A. Macdonald, Minister of the Interior, to show the state of the Dominion Land Surveys in certain districts, and in the present issue the boundaries of Assiniboia, Alberta, Saskatchewan, and Athabasca have been added, and subdivision surveys coloured green. Some corrections in the general survey would also seem to have been made; this is very perceptible in the great difference of configuration between Athabasca Lake as laid down in the 1880 map of the same district, and the present. There is also an inset Index and a list of the authorities, other than the Dominion Land Surveys, which have been used in the production of this map.

CHARTS.

Admiralty:—

CHARTS THAT HAVE BEEN CANCELLED.

No.		Cancelled by	No.
359	Harbours in Japan	New chart, Nagasaki to Karatsu	359
491	Deseada and Mariagalante	New plan, Anchorages in Guadeloupe and adjacent islands	491
492	Saintes		
805	St. Anne anchorage and port du Moule		
2864	Beaufort harbour	New plan, Beaufort harbour	2864
2622	Fair Isle	New plan, Fair Isle	2622
2842*b*	Plan of Pillau harbour on this chart	New plan, Pillau harbour on	2369
1932	Port Guatulco Morro Ayuca	New plan, Ports and anchorages on west coast of Central America	439
1048	Buccaneer archipelago to cape Lambert	New chart, Buccaneer archipelago to Bedout island	1048
1052	Buccaneer archipelago		
1754	Ragged point to Pih-ki-Shan	New chart, Ragged point to Wên-chau bay	1754
1759	Pih-ki-Shan to Hieshan islands	New chart, Wên-chau bay to Kweshan islands	1759
2094	Isle of Man	New chart, Isle of Man	2094
1053	Dampier archipelago.		
1054	Exmouth gulf.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1. North Atlantic ocean:—British islands to Mediterranean sea. 644. Africa, east coast:—Delagoa bay. 645. Delagoa bay:—Port Melville. 2484. England, Thames river:—London to Gravesend. 2491. North America, east coast:—Approaches to New York. 216*a*. Bay of Bengal:—Mergui archipelago. 1386. Pacific ocean:—Easter island or Rapa Nui. 2443. South America, east coast:—Paraguay river. 2149. Eastern archipelago:—Gaspar and Banka straits. 822. Bay of Bengal:—Cheduba strait to Coronge island. 518. Australia, west coast:—Sharks bay. 1058. Australia, west coast:—Rothnest island to Warnbro sound. 280. Newfoundland, east coast:—Notre Dame bay. 1118. Scotland, north coast:—The Shetland isles. 2487. North America, east coast:—Portsmouth harbour. 2885. North America, west coast:—Anchorages in Lower California. 2544. South

America, east coast:—Rio de la Plata. 2690. France, west coast:—Brest roads. 2400. China:—Min river. 1760. China:—Chauan bay to Port Matheson. 1761. China:—Port Matheson to Ragged Point. (*J. D. Potter, agent.*)

Trinidad Island.—West Indies:—Chart showing the set of currents in the vicinity of Bocas de Drago, by George A. Harragin, M.M. Scale 6·2 cables to an inch. D. McGregor and Co., Glasgow, Greenock, and Liverpool.

This is a rough reproduction of Admiralty Chart No. 2097. It seems to be intended to show, graphically, the information contained in the 'West India Pilot,' vol. i. page 81, and gives but few of the soundings shown on the above-mentioned chart.

United States Charts:—

No. 904. West coast of North America between latitudes 51° 30′ and 55° 30′ N. embracing the Queen Charlotte Islands, Hecate Strait, and Dixon Entrance. From British and United States Surveys to 1881. Price 2*s.* 1*d.* 909. Pacific Ocean, Behring's Sea, Providence Bay. From a Survey by Lieut. Maksitowitch Impl. Russian Navy, 1876. With plans of Plover Bay and Slawianka Bight in Plover Bay. Price 1*s.* 3*d.* 910. North Pacific Ocean, Anadir Bay, Behring Sea. From a chart by Engineer Bulkley, of New York, with corrections and additions. Price 7½*d.* 915. West coast of Mexico, Manzanilla, and Santiago Bays. From a Survey by Commander J. W. Philip, U.S.N., and the Officers of U.S.S. *Ranger*, 1882. Price 1*s.* 8*d.* 916. Cuba, south coast. Approaches to Ports Casilda and Masio, with the adjacent anchorages. From a Spanish Government Chart of 1879. With a plan of Port Casilda. Price 1*s.* 3*d.* Hydrographic Office, Washington D.C., 1882–83.

ATLASES.

Letts, Son, & Co.—Letts's Popular Atlas, being a series of maps delineating the whole surface of the Globe, with many special and original features; and a copious index of 23,000 names. Letts, Son, & Co., London, 1883. Prices from 2*l.* 2*s.* to 6*l.* 6*s.*

EDUCATIONAL.

Italy.—Richard Kiepert's Schul-Wand-Atlas der Länder Europa's. Fünfte Lieferung: Stumme Physikalische Wandkarte von Italien. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. 4 sheets. D. Reimer, Berlin, 1883. Price 4*s.* 6*d.* (*Dulau.*)

——— Richard Kiepert's Schul-Wand-Atlas der Länder Europa's. Sechste Lieferung: Politische Wandkarte von Italien. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. 4 sheets. D. Reimer, Berlin, 1883. Price 4*s.* 6*d.* (*Dulau.*)

These maps form part of a series of school maps of European countries which is in course of publication by the same author, those of the British Isles and France having already appeared. The system of cartography throughout this series is uniform and leaves little to be desired. In the political map all boundaries are clearly marked, and the populations of the towns in December 1881 are indicated by symbols; and in the physical map, the elevations to 3000 mètres and upwards are shown by seven shades of colour; Rivers, Lakes, and Swamps are also clearly laid down. On the whole, this series of maps is admirably adapted to the purpose for which it is published.

Sachsen, Schulkarte vom Königreich——, von G. Kullmann. Scale 1 : 150,000 or 2 geographical miles to an inch. Gadow und Sohn, Hildburghausen. 6 sheets, chromolith. Price 6*s.* (*Dulau.*)

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

China, in some of its Physical and Social Aspects.

By E. Colborne Baber, Chinese Secretary to H.M. Legation, Peking.

(Read at the Evening Meeting, April 23rd, 1883.)

The hundred and tenth meridian bisects China with happy accuracy. You will notice how, in the extreme north, it defines the great southward bend of the Yellow River, and in the extreme south, divides the island of Hainan. Moreover, it follows, with curious felicity, the demarcations which separate the twelve eastern from the six western provinces. The same meridian cuts the Yangtsze in the middle of the great gorge; and if you will put one point of a pair of dividers on that spot, and stretch the other to a radius of ten degrees, you will describe a circle which will pass through Peking, and will delineate not only the long arc of coast, but the whole border-line of China Proper, with very pleasing correctness. Even the irregularities balance one another so perfectly that they are a help to the memory; the point of Kansu, in the north-west, corresponds with the promontory of Shan-tung in the north-east, and the extremity of Yun-nan which juts out towards Burma is balanced by the Chinese island of Formosa. Kuldja and the Manchu province of Shing-king are not included in China Proper.

School-books have succeeded in imposing upon the youthful mind the belief that China is a level country abounding in canals; but the canals are confined to the eastern coast-region, and are for the most part natural depressions which have been connected by cuttings of no great length or engineering difficulty. It is only to the east of the 110th meridian that the country is comparatively level, populous, and thickly cultivated; westward of that line it is everywhere mountainous, and with the one exception of part of the province of Ssŭ-ch'uan (Se-chuen), exceedingly poor and sparsely populated. The further one travels west the more mountainous and broken the surface becomes. I have ascended the Yangtsze to a point where one of its banks is 7000 feet, and the other 16,000 feet, above the level of the river. I have climbed a

mountain 11,000 feet high only to find on the top of it another mountain of 8000 or 9000 feet. Near the same region there are two, almost vertical, precipices; and if you were to fall off either of these, you would have to fall through a sheer astronomical mile of space before reaching the bottom. It is true that these are exceptional instances, and that they occur in the extreme west of China; but if you will refer to Captain Blakiston's book—'Five Months on the Yangtsze'—you will see that to discover mountains and precipices of perfectly satisfying grandeur and perpendicularity, it is not necessary to go further west than our favourite meridian of 110°.

Of the two great rivers of China, the Huang-ho and the Yangtsze, I shall say little. The Huang-ho is, in any practical sense, unnavigable. But the Yangtsze is navigable, and navigated, from longitude 104° to the sea, by vessels drawing six feet of water. There is no reason why suitably constructed steamers should not ascend to the point in question, 1350 miles from the coast; but steam-transit has hitherto been stopped by a series of rapids, a hundred miles long, which are bisected by our famous medial line of the 110th meridian. These rapids have been examined by a certificated pilot, of experience, discretion, and repute, who is firmly persuaded that they offer no serious obstacle to steam-navigation. But the British merchant-prince has not yet seen his way to embark in the undertaking.

What is the total population of the eighteen provinces of China Proper, is a question which very frequently arises, and to which many very diverse estimates have been offered in reply. The more exaggerated of these estimates, which in some cases reach the incredible number of five hundred and fifty millions, are based upon the native census, an authority which must seem utterly untrustworthy to any one acquainted with the lower class of Chinese officials who would be employed upon such work. The opinion which the Chinese themselves are apt to hold with respect to the value of a census, may be gathered from the following story, which was told me by a native.

In very early times the city of Wu-ming-hsien, in the department of Mei-yu-fu, in Central China, was administered by a Prefect of more than usual energy and discrimination. Being directed by the Governor of the province to institute a census of the population, he appointed two deputies to make the necessary returns, taking, at the same time, every precaution to prevent communication and consequent collusion between them. When the two independent reports were sent in, they exhibited such an enormous discrepancy that they were cancelled, and the deputies were reported to the Governor for punishment. The Prefect then appointed two other officers to number the people, but this pair, more fortunate than their predecessors, managed to communicate with one another, and returned exactly the same total, viz. 20,401. But the Prefect, clever man, suspicious of so precise a coincidence, put the two

officers apart and separately asked them: "20,401;—was that odd *one* a male or female?" To this the officers were unlucky enough to make conflicting replies, and they were reported to the Governor for punishment.

The Prefect then determined to take the census in person, and set out for the city; but in the meantime the population, alarmed at the pertinacity of the Prefect, and apprehending that he was coming to levy some oppressive tax, fled from the city and hid themselves in the fields. The astonished Prefect, finding the city deserted, and fearing to be reported to the Governor for punishment, hanged himself in the gate. Firmly clenched in the grasp of the suicide was found a paper with the following words:—

Return of census of the city of Wu-ming-hsien, in the department of Mei-yu-fu:

Men	None
Women	None
Children under 14 years of age, of both sexes ..	None
Grand Total	None

Now, in default of exact returns, since nearly all parties agree that the returns cannot be trusted, what have we to go upon? Not much, it is to be feared. But still, if we compare China with India, I think we may arrive at something not remotely distant from a fair approximation. I have had exceptional opportunities for making the comparison, having crossed China three times, and having circumspectly traversed both Burma and India. And I have arrived at this conclusion, that the populousness of India, both in its denser and thinner conditions, agrees very well with that of China. If we remember, at the same time, that the area of British India is somewhat larger than that of the Chinese provinces, and that India is far less mountainous, we shall, I think, conclude that the extent of population in both countries is not widely different. Two hundred and fifty millions, or a little more, is therefore, probably, a fair enumeration of the Chinese inhabitants of China, and this conclusion accords with the estimate * of my friend Mr. Hippisley, of the Chinese Customs, who has obtained it by a different and independent method.

This population is far from being so homogeneous as is generally supposed. I have often heard English people assert their inability to distinguish one Chinaman from another; but it may surprise you to hear that a Chinaman, on first coming into contact with Europeans, makes exactly and precisely the same remark of ourselves. To him all Europeans are alike, and I fear you will scarcely believe me if I assure you that, at first, they have some difficulty in even distinguishing a

* Published in the "Returns" issued by the Statistical Department of the Chinese Maritime Customs in 1877–1878.

lady from a gentleman. Of this remarkable fact, so flattering to the sex of which I am the humblest representative, I could recount several illustrations; but one will suffice.

A Protestant bishop, newly appointed to a missionary see in China, wished to pay a visit of ceremony to the Taotai, or Chinese official, who had charge of the city which was the bishop's headquarters. As he was to be accompanied by the British Consul, in uniform, the bishop appeared for the occasion in his episcopal robes and lawn sleeves,

"Clothed in white samite, mystic, wonderful,"

a costume which to a Taotai fresh from the far interior was, as you may imagine, utterly beyond all scope of comprehension or conjecture. The interview passed off with the usual formalities. The Consul offered a few neat and appropriate remarks about the weather, and the Taotai replied with a few passing allusions to the state of the crops, gazing from time to time upon the bishop with furtive but ill-repressed curiosity. The visitors took leave; and on the morrow an Englishman who had business with the Taotai was thus addressed by that functionary: "The Consul was very polite and amiable during the visit he paid me yesterday; but, tell me, why did he bring his wife? Why did he bring his wife?"

In spite of a general persistence of type, there is at least as much variation among the natives of the Eighteen Provinces as there is among the inhabitants of Europe. In considering the existing Chinese nation from any general point of view, we are apt to forget that, a thousand years B.C., they occupied a mere fraction of the territory which they now possess; that even then they were not homogeneous in manners or in speech; and that they were environed by many non-Chinese indigenous peoples. All this we know from their own records. Since that time, the Chinese have gradually spread, not by ousting or exterminating their neighbours, as is too generally and inconsiderately assumed, but by a process of absorption; in other words, that they migrated among them and intermarried with them, and their superior energy and comparative civilisation gradually effaced the national characteristics of the surrounding tribes. The same process is still going on in Tibet, in Burma, in the Shan country, in Tong-King, and in our own colony of the Straits Settlements; and it is quite safe to assert that in a few centuries all those regions would become quite as Chinese in form and in fact, as the existing provinces of Kuei-chou and Yun-nan (which are at this day more than half-peopled by non-Chinese races), were it not that the far more persistent and dominating presence of the European bars the way.

I think you will see that, under this long-continued process of extension by absorption, the original Chinese race, whatever it may have been, must have lost its originality and its purity, and become a

mixture of a great many races. The Chinese blood has in this way been mingled with that of such diverse stocks as the Tatar, the Turki, the Tibetan, the Burmese, the Mon-annam, the Tai, and perhaps the Polynesian.

There is one indigenous tribe, or people, now completely enveloped by a Chinese population, which has successfully resisted the wave of Chinese encroachment. The Chinese denote them by the term *Lolo*, a word of no ethnic value; but in their own tongue they call themselves Lo-su and Ngo-su. They inhabit a very mountainous region on the left bank of the Yangtsze, between the parallels of 27° and 29°; and so completely independent are they of Chinese influence and jurisdiction, that they not only make incursions upon Chinese territory for the purpose of exacting blackmail and ransom, which they call "*rent*," for land of which they were dispossessed some 200 years ago, but they actually maintain a large slave-population, entirely composed of Chinese, which they capture in the course of the same incursions. I shall not at present detain your attention with a description of their manners and condition, which I have already contributed to the annals of this Society. I will merely mention that they are a very robust and warlike people, and occupy a country which may be considered impregnable. You may take that statement on the faith of Marco Polo, who says of them, "they are a tall and very handsome people, though in complexion brown rather than white, and are good soldiers. They have a good many towns, and a vast number of villages, among great mountains, and in strong positions."

But, probably, it is not their bellicose character nor their advantageous situation which has enabled them to maintain so persistent a nationality. The secret of their independence is more likely to be found in the fact that they never intermarry with the Chinese. Even the Chinese women, whom they capture in periodical forays, are only carried into bondage to make wives for their Chinese slaves. It is certain that they maintain a very strict code of ethics in that respect, and I may quote, in proof, the evidence of a Roman Catholic missionary, now a bishop, who had the misfortune to be taken prisoner by them. He writes: "During the forty-eight hours, more or less, which I spent with them, I noticed a fact which has singularly surprised me. I had always supposed them to be a singularly corrupt people, for such is the reputation which the Chinese have given them. I can nevertheless testify that with the exception of a few expressions, rather vulgar than indecent, I saw nothing in their manners of which even a Christian need be ashamed. Of course, this is no proof that these robbers are always so well-conducted when they return to their mountains, but it shows at any rate that they can behave well when they choose, even in the midst of an incursion which is favourable to every abuse of power."

Seeing that the study of this interesting people is of no small importance in connection with the history of Chinese migration, and is even throwing light upon the evolution of the art of writing in Eastern Asia (as my friend Mr. Terrien de la Couperie has established), it may be worth while to explain more fully than I have hitherto had opportunity of doing, the process by which I succeeded in identifying them with the *Coloman* of Marco Polo.

The account of the Lolos which I have given in papers already published by the Society, accords perfectly with Marco's description of the Coloman, cited above. But the Venetian traveller goes on to say that "when any of them die, the bodies are burnt, and then they take the bones and put them in little chests. These are carried up the mountains, and placed in great caverns, where they are hung up in such wise that neither man nor beast can come at them."

The Lolos still burn their dead, in the recesses of a grove, and the following excerpt from rough notes which I kept during the Grosvenor expedition in 1876 corroborates the disposition of the "little chests." It should be remarked that, at the time of writing, I was but slightly acquainted with Lolo customs, and did not immediately appreciate the coincidence.

The note runs, verbatim, as follows, under the heading February 12th, 1876:—"Before reaching Lao-wa-tan we were shown ledges on inaccessible cliffs on which coffins of a very small size were to be seen. I, however, did not observe any. These are supposed to be relics of a bygone barbarous age before the Chinese occupation. When asked how they were ascertained to be coffins, the natives replied that the monkeys, which in summer are very numerous, throw them down the cliffs. It is a source of wonder to the Chinese how they could have been placed in these inaccessible situations."

"A great deal of gold is found in the country," says Marco; and at the present day the Lolos bring down for exchange no small quantity of this metal in thin plates. A Chinese proverb, referring to a valley somewhere in the north of Lololand, declares that if the plain of Wantan were dug (for gold) there would be no paupers on the face of the earth;

"K'ai-liao Wan-tan-p'ing
T'ien-hsia wu ch'iung jên,"

which is economically false, but not devoid of geographical value, in despite of Captain Burton's theory that "geography is good, but gold is better."

The Coloman, or at any rate the autonomous branch of them, are now restricted to a narrower territory than they occupied in Marco's time; for which fact we have their own authority conveyed in a statement made by one of their chiefs to the missionary mentioned above, who relates, in the course of a narrative of absorbing interest, how one

of the chiefs said to him, "'Do you know who we are?' The question seemed a difficult one to answer, since I did not know what he was driving at. I got out of it with a bit of Gascon slyness, which could not however have deceived any one, for the chief immediately added, 'Well, well! you are frightened to-day. We know you Chinese call us thieves and robbers, but it is you who are the robbers. All this country once belonged to our fathers; they had always been its masters and peaceable possessors until the Chinese came and unjustly expelled them. We were the weaker, and had to yield; our country was neither sold nor given away; we come to collect the rent. If you retire to your own territory you will find that we shall not follow you.' 'But, at any rate,' I replied, 'you need not kill the sick and feeble.' 'If we did not,' said he, 'who do you suppose would follow us? They would all pretend to be sick, and we should never make a single capture.' Unfortunately for the Chinese Government, this is true. It is admitted that the first emperors of the present dynasty gained possession of Yun-nan by the violent expulsion of the aborigines; but it remains to be known whether the latter gave occasion to severe repression by their brigandage." *

How far Lolodom originally extended cannot now be ascertained with desirable precision; but it is unquestionable that this interesting race of mountaineers still ranges—somewhat sporadically in places—as far east as the western districts of the Kuei-chou province. They possess the art of writing—as I have shown by procuring exemplars, and I am able to record, with much pleasure in now publishing the fact for the first time, that Major-General Mesny, of the Imperial Chinese Army, some years ago obtained a thick folio manuscript from a tribe near Chên-ning, in Kuei-chou (lat. 26°, long. 105° 40′, roughly). I have carefully examined this work, which is bound in goat-skin with the hair on, and am able to assert that it is written in ordinary Lolo script, *and contains illustrations*, of a crude and primitive nature, depicting human figures, animals, and plants. This invaluable document is at present treasured in a too recondite cupboard in the rooms of the China Branch of the Royal Asiatic Society, in Shanghai.

The point where this Lolo folio was discovered lies at the eastern limit of the country which, long previous to my researches, Colonel Yule had surmised to be represented by Marco's Coloman. That region is indicated by the Venetian with complete lucidity. From the modern Ami-chou, which in his time was called Anin, identically what he calls it, he came in eight days to Coloman, and in twelve more to Sinugul, which latter name is a transcriber's metamorphosis of Siugiulu, Marco's manner of writing the contemporaneous name of the modern Siu-chou-fu, locally known as Sui-fu.

Baron v. Richthofen several years ago suggested the main line of

* This curious episode of missionary adventure is recounted by Mgr. Fenouil, Bishop of Yun-nan, in the 'Annales de la Propagation de la Foi.'

this argument and Colonel Yule was inclined to accept it. I claim no more credit in the discussion than a faith in the Baron's sagacity and in Colonel Yule's erudition.

To say that all Chinese are alike is therefore, not to use too severe a term, inexact; they include wide discrepancies of physique and even of colour, as is obvious to every one who has travelled in their country; they are animated among themselves by mutual antipathies and even hostilities. Their languages vary, if not radically, at any rate to the extent of mutual incomprehension. A Chinese official appointed to a post in Hu-nan or in Kuang-si, has to employ interpreters. To ask "Can you speak Chinese?" is very much the same as to ask "Can you speak European?"

The emigrant Chinese, that is to say the coolies, of whom we have heard so much lately in Australia, in India, and in Singapore and its neighbourhood, come almost exclusively from the extreme south-east of China. It is not without some hesitation that a native of Peking or Nanking can be brought to regard them as fellow Chinese, and you will remember how well and cheerfully they served us against their countrymen of the north in the coolie corps which we raised in the war of 1860. These emigrants speak at least three totally distinct languages, and engage among themselves in the most furious faction-fights, as is notorious to every resident in Singapore. Nevertheless, they do manage to find some sort of *modus vivendi* and to maintain a certain order, assisted as they are to that end by the rude and ready arm of the British policeman. But if you bring these same emigrants into contact with emigrants from Central or Western China, you will find that the two incompatible elements will not mix. The only case where the experiment has been put to the test is in the Burmese region. Native Burma contains no inconsiderable Chinese population which has come down overland from Yun-nan. The Chinese emigrants in British Burma have, of course, come round by sea from Canton or Fukien. But the two contingents do not approach one another and intermingle, but remain apart, the one in native Burma and the other in our own territory. I once brought a native of Yun-nan down the Irawadi to Rangoon, where, if he had stayed, he might easily have earned two shillings a day; but he only remained a few hours and then returned, finding as he told me, that the Cantonese would make his life very uncomfortable if he did not learn their language and join their society.

It is to be feared that this discussion cannot have much interest for you; but I hope that it will at least induce you to reconsider the preconceived opinion that the Chinese are a homogeneous people. The subject possesses a practical bearing of some importance at the present moment when the steady hand of England, bearing a golden key, is about to unlock the rich secrets of Borneo, and perhaps of New Guinea. Those remote and obscure lands can be colonised only with the help of the Chinese, for the clear reason that there is no other people to accom-

plish the task; and it behoves the projectors and organisers of this civilising work to be forearmed, as they doubtless will be forearmed, against the element of discord which I have endeavoured to indicate.

To turn to the question of religion. I am persuaded, as the result of many conversations with natives, that the Chinaman is incapable of understanding the refinements of dogma; indeed, the language is incompetent to express the subtleties of theological reasoning, just as it is inadequate to represent the nomenclature of European science. It is true that some sort of equivalents exist for the simpler cases of scientific terminology, but these have been invented and introduced by Europeans and, in the absence of a European to explain them, are unintelligible. How obscure the technicalities of Christian theology must appear when conveyed, in Chinese, to a Chinaman, may be judged from the fact that an apparently interminable controversy has long been raging among missionaries of various denominations on what would seem to you the simple question of rendering into Chinese the word *God*.

But this is a delicate subject, and I will not pursue it; for you will ask me if a Chinaman cannot understand Christianity, how can he understand the refinements of Buddhism, which is, perhaps, a more subtle cult. I shall reply, with some alacrity, that he does not understand it, and what is more, that he never did, and what is most, that nobody ever did, or can, or will. Divested of its excellent morality and its sweet teaching of gentleness and benignity towards every thing that lives, what core of spirituality does Buddhism retain? Nothing beyond a mere hope, most ardent and sincere and pervading and intense, but still only a hope, to free not merely the whole human race, but every living creature, from the desires and affections and cares and miseries which are inseparable from existence. And this consummation, known as Nirvana, which is itself incomprehensible, is to be ultimately achieved by a process of abstracting the mind from the contemplation of everything but the abstract; you must not think of thinking of anything but the unthinkable. Don't let us think any more about it. Such thinking, in the words of a famous parody,—

> "is but an idle waste of thought,
> For nought is everything, and everything is nought."

Let me relieve your minds from this metaphysical burden by quoting a passage from a Chinese poet whose verses were inscribed, in the year 1603, upon a brazen tablet on the summit of a sacred mountain, in the furthest west of China, where I saw them, a few years ago, and brought away a copy. The lines form part of a Buddhist hymn:—

> "Man, and all mortal creatures, lose their way
> At midnight in a mighty wilderness,
> And face to face with Buddha in the dark
> They know him not, nor anything discern.
> But suddenly they see the bright red disc
> Coming in fiery splendour from the east."

Without stopping to notice the close connection between Buddhism and solar worship, and the symbolism of the wheel, which is here indicated, I will ask your permission to quote a few lines from another poet, where the same ultimate thought and the same supreme aspiration of Buddhism occur, and, curiously enough, the climax takes the same form of literary expression. This time the poet is an Englishman, whose name is Alfred Tennyson :—

"I had a vision when the night was late;
A youth came riding toward a palace-gate.
He rode a horse with wings, that would have flown,
But that his heavy rider kept him down.
And from the palace came a child of sin,
And took him by the curls, and led him in.

* * * * *

And then I look'd up toward a mountain tract,
That girt the region with high cliff and lawn;
I saw that every morning, far withdrawn
Beyond the darkness and the cataract,
God made Himself an awful rose of dawn.

* * * * *

At last I heard a voice upon the slope
Cry to the summit—'Is there any hope!'
To which an answer peal'd from that high land,
But in a tongue no man could understand;
And on the glimmering limit, far withdrawn,
God made Himself an awful rose of dawn."

These comparisons, and these considerations, will serve to give some general idea of Buddhism in its higher and more cultured aspect. But in the China of the present day this phase of the faith is completely extinct. It has never been my fortune to meet with an educated Chinaman possessing any knowledge whatever of the inner and truer significance of Buddhism. Indeed, the theory of Confucianism, which is a system of social order and very crude moral philosophy, contemptuously waives the discussion of *all* religions, treating them indeed with such disdain that it scarcely condescends even to persecute them.

The ordinary work-a-day Chinaman *is*, however, in some vulgar sense a Buddhist. But his simple and natural mind has transformed Buddha into a personal and superintending deity who can be prayed to, and propitiated by vows, offerings, and pilgrimages. When asked if he believes in a future state, he replies that he doesn't know anything about it. But you will often find that he has some vague notion of a world to come, which, however, will be modelled on the existing mundane system, and will contain a material emperor, with material mandarins, gaolers, executioners, and tax-gatherers, all of the present type. How far this conception differs from the Buddhist ideal I need not stop to indicate. Instances of a peculiar simplicity of logic, or of

expression, are often met with among the more devout Chinese, whether Christian or Buddhist; and such cases are at times very puzzling to the stranger. I will quote two examples, the first of which occurred to a missionary who, seeing a countryman burning incense before a wayside shrine, asked him, "What's the good of burning incense to Buddha?" The Chinaman looked up, and then reflected, and replied, "Well, if you come to that, what's the good of *not* burning incense to Buddha?"

The other case occurred to myself. I was nearing the end of a long day's march, when I saw an old man and his daughter sitting at the mouth of a coal-mine. Learning from him that the end of the stage was close at hand, I entered into conversation, in the course of which the girl asked me suddenly if I was a *Pi*, or a *Tan*. I was obliged to confess that I did not understand her, and from that moment the pair treated me rather coldly. It was not till long afterwards that I discovered the significance of the question, and learned that it is a pass-word by which native Christians in that district recognise a fellow-believer. The words mean, "Are you a heathen, or a Christian?" The expression *Tan* being the final syllable of the word Ki-li-tan, which is the nearest the Chinese can get to the pronunciation of the word *Christianus*. Now *Pi* means a heathen; but I think you would not guess its derivation, even if I were to give you until the next meeting of this learned and distinguished Society. Well, *Pi* is the first syllable of Pilatus, otherwise Pontius Pilate. The ingenuous Chinese converts have selected the wicked mandarin of Judæa as the representative of all that is characteristic of Paganism.

The Chinese question, both in its social and physical aspects, is now merging in the larger consideration of international comity and community; and in close connection with this subject I should like to say something about trade-routes, English as well as French, in other words, from the Burmese side and from the side of Tong-King.

With reference to the route viâ Bhamo, which still finds advocates, I will at once concede that the Irawadi is the natural highway of Burma; that the extension of railways will ultimately reach Bhamo; and that the construction of a highroad from Bhamo to the Chinese town of Momein presents no formidable difficulty. All these facts are undenied and undeniable; but the fatal objection remains that the proposed route leads into a blind alley, and that the real difficulties only begin at Momein. Between that town and Ta-li-fu—a distance of 150 miles—no less than six passes, 8000 feet high, have to be crossed. The country is miserably poor and thinly peopled, and great stretches of it are barren or at any rate uncultivated downs, rugged hill-tops and ravines, and steep slopes covered with virgin forest. The western and northern parts of the province have gained such evil repute among the Chinese for all the miseries and accidents of travel, that the wayfarer in those inhospitable tracts is said, in popular phrase, to "eat the bitterness

of Yun-nan." But even if Ta-li-fu be reached very little is gained. The populous and commercial districts of Ssŭ-ch'uan are still 600 miles distant, and are only to be attained by travelling through the kind of country above described to Sui-fu, or, as an alternative, to Yachou by the Batang route, which includes some twenty passes more than 12,000 feet above the sea-level. I am exaggerating nothing: all these heights and distances have been measured by the lamented Captain Gill or myself, and it would be unnecessary to adduce them were it not that the advocates of the Bhamo route seem to refuse them attention.

At the same time I am far from denying the importance of Bhamo as a commercial outpost. At no very remote period it will probably form the link of connection between the railway systems of Burma and Assam. It already possesses a certain trade, and Colonel Sladen's projected road will open to easier access the rich valley of the Tapeng, and the unexplored but undoubtedly productive region of the Upper Irawadi. These are obvious and immediate advantages; but to maintain that the trade of the populous and commercial centres of the "far East" will ever flow uphill to Bhamo requires a faith which can indeed remove mountains.

Very much the same reasoning applies, *mutatis mutandis*, to the French project of opening Yun-nan by the way of the Red River from the Tong-King side. We will at once admit, as before, that the Red River is the natural highway of Tong-King, and if our enthusiastic neighbours seriously desire to colonise that debatable land, and can do so reasonably, justly, and humanely, I for one wish them every success. The opening of that approach will no doubt induce a current of small traffic which is at present interrupted by the exactions of the Chinese filibusters known as the Black Flag confederacy. But the Red River will not bring the French into communication with any populous and productive part of China. It will, at best, only carry them to the frontier of a region of high plateaus and profound ravines, unfertile and little cultivated, inhabited by a sparse population of heterogeneous tribes, disturbed, distressed, and miserably poor. But let us assume that all the physical difficulties of the route have been successfully surmounted, and that some comparatively rich centre of production, say the capital itself, has been attained, either from Bhamo or from Hanoi. What will the trade-apostle gain in reward for his labours, dangers, and sufferings? He will find himself standing in the middle of a poppy-field, and wondering how he ever came to forget that the only lucrative industry of Yun-nan is the cultivation of opium.

It was evident to Mr. Grosvenor and the members of the Margary Mission that if it is desirable to open Yun-nan commercially—which I make bold to doubt—the approach must be made from the south by ascending the valleys, and this conviction has been powerfully confirmed by the experience of the latest traveller in those regions, Mr.

Archibald Colquhoun, as you will find recorded in his book 'Across Chrysê.' It is to be hoped that Mr. Colquhoun may be induced to follow up his most interesting and suggestive journey by another expedition from the Shan side. But I take the liberty of urging him —in the event of his undertaking a second chapter of exploration— not to make trade-communication with Southern China the chief purpose of his travel, but rather to aim at the improvement of commercial relations between British Burma and the Shan population. It would be impertinent of me to remind him that the Shans, a lettered and civilised people of Siamese race, but of more than Siamese energy and enterprise, are animated with very friendly feelings towards their English neighbours, and occupy a vast territory with which we already possess a well-established commercial intercourse. The extension and improvement of that intercourse cannot fail to bring us into communication with Southern Yun-nan, which province, indeed, is peopled in a very important degree by immigrants or natives of Shan lineage.

In introducing Mr. Baber,

The PRESIDENT said the paper to be read was on China in its Physical and Social Aspects, by Mr. E. Colborne Baber, whose previous papers and contributions to the Society had won the admiration of all real geographers. In the year 1876, Mr. Baber accompanied Mr. Grosvenor, now First Secretary of Legation at Peking, in his expedition across Southern China to Bhamo, through the province of Yun-nan; in 1879 he executed a journey of great extent through a country previously undescribed, in the great province of Se-chuen, and there met with an aboriginal mountain tribe, the Lolos, who had an alphabet of their own which had never been deciphered; and in the following year he pursued his investigations into another part of the country that had never been described by any European. During these journeys he made a vast number of careful astronomical observations, fixing the latitude of 120 places and the longitude of many others. The literary style in which those results were brought before the public was a model for geographers. The scene of his explorations had been the two provinces of Yun-nan and Se-chuen. Yun-nan, the smaller of the two, was about the same size as Great Britain and Ireland. His journeys were a continuation of the labours of their eminent gold medallists, the German Richthofen, the French Garnier, and the English Captain Gill.

The following discussion ensued on the reading of the paper:—

Sir RUTHERFORD ALCOCK said that Mr. Baber had shown that he could convey a great deal of instruction in an amusing manner. The subject which he had dealt with was a large one. The paper had left an impression on his mind that the author had not treated China quite handsomely. First of all he had minimised the area, and said that China Proper was smaller than India. That was to him a surprising statement; but he would follow Mr. Baber blindfold in any matter of geography. The author had also called the Grand Canal, which people were accustomed to regard as one of the great achievements of the world, little more than a ditch, and he had also cut the population down one-half. Fortunately he had not touched the Great Wall of China, and this was still left therefore for the rising generation to welcome as an eighth wonder of the world. The part that China had played in the history of the world, and more especially in the destiny of Asia from the earliest historic period, was such that it was impossible to regard it without a feeling of intense interest.

The Chinese had shown an example of one who was not divinely inspired, exercising through nearly 2500 years an authority, weight, and power which the founders of other religions might well envy. That was a very remarkable fact which rather militated against the argument that there was no homogeneity in the Chinese race. It was quite true there had been a great mixture of tribes, races, and clans, and that the inhabitants of the different provinces could not understand one another; nor was it an uncommon case for inhabitants of villages 20 miles apart to be unable to converse intelligibly with one another except through the written language. Still, it had been a mighty empire, and though it was the Mongols who first led the way across Asia, they amalgamated so much with the Chinese, that the latter must be regarded as taking part in that great succession of raids by the descendants of Genghis Khan which culminated in the Turkish advance to the gates of Vienna, and which held all Europe for a time in suspense. The great characteristic of the Chinese was tenacity of purpose. They never seemed to forego an object that they had once made up their minds to accomplish. Yarkand was reconquered after a lapse of ten or twelve years, as was also Yun-nan, which for a long time was in rebellion. In this respect the Chinese differed materially from all other Asiatic races with which he was acquainted, and they were the characteristics of a nation, not of a mere agglomeration of peoples and tribes.

Sir Thomas Wade quite agreed with Mr. Baber as to the invariable tendency to over-estimate the population of China. In the beginning of the present century it was taken for granted that the population was 300,000,000. In the course of the last century the Jesuits estimated it at 150,000,000, and others at 230,000,000. The great emperor who reigned for sixty years, in the middle of the eighteenth century, was filled with apprehension at the extraordinary growth of the population recorded to him by those who had taken a census. In 1816 the number was set down as 330,000,000, and in 1850 it was reported to be 412,000,000. That was before the outbreak of the great rebellion, or, at all events, before it was regarded as having begun. He had seen a census taken at Canton, when all the regular formalities were observed, and the whole thing looked so complete, that in a European country it would have been regarded as a trustworthy return, but he was quite sure it was not. In 1860, when the Summer Palace was taken, the records captured there showed that a full return of all the provinces was made in the twelfth month of every year. The most recent which he saw was 412,000,000, but he was certain that it was nothing more than a *pro rata* augmentation. As a matter of fact, the province of Kuang-si had been in a state of rebellion since 1846, and was overrun by brigands, but he could not doubt that the census was regularly reported. From the year 1852 the great band of rebels moved north upon the great valley of the Yangtsze: in the spring of 1853 they took Nanking, and in six weeks marched 700 miles, to within 80 miles of the capital. For the thirteen subsequent years they were so far in possession of certain parts of China as to render any census of it impossible, and he could testify that a number of cities which were vast centres of population were destroyed, and had not yet been adequately restored. It was a generally received opinion that one-half of the population had perished, and, therefore, he was not astonished to hear, last year, especially as there was a terrific famine in the north-western provinces six years ago, that the census was not higher than 285,000,000, as made by the Board of Revenue in the year 1881. Geography books put the population of Peking at 3,000,000, but after residing there for upwards of twenty years, he came to the conclusion that it was not half a million; and a French physician, who had been making observations in a more regular way, was of opinion that it was about 400,000. At the point where the Yangtsze received the Han river, besides an enormous perpetual fair, or open market town, Han-kow, there were two cities,

one of considerable importance. The population of Han-kow was formerly set down as about 3,000,000, but when he was there in 1868, after the place had been occupied three times by the rebels, he went to the top of a hill which overlooks Han-yang-fu on the left bank, and Wu-chang-fu on the right bank, and both he and Mr. Lawrence Oliphant came to the conclusion that there never could have been a population of more than half a million. The outline of what had been was sufficiently discernible for them to make the estimate. With regard to the homogeneity of the Chinese, he entirely agreed with Mr. Baber. In the year 1853 Shanghai fell into the hands of some riff-raff, who called themselves a society, and professed to be a branch of the great Taiping Confederation; but they were in reality a collection of Cantonese and Fe-kien adventurers of the lowest description. They had possession of the town some six weeks before the imperial forces came to dislodge them. For eighteen months the imperial army grew around the town, and was composed of men drawn from ten provinces. He had plenty of opportunity of conversing with them, and at the end of the campaign, he could tell what province any man he met belonged to. As had been observed, it was generally considered that the Chinese were so much alike that it was difficult to distinguish one from another. Their habit of shaving the head had a great deal to do with that; but no one could be many years in China without perceiving that there was a very marked distinction between the men from the far west, from the south, and from the north. Still more remarkable, they would not fail to notice an extreme difference between the inhabitants of Kuang-tung and Kuang-si, and all the rest of the empire. It appeared to him that the people of Kuang-tung must have been a Malay immigration, but their spreading northwards was stopped by a vast range of mountains 8000 or 10,000 feet high. It was noticeable that the Cantonese never spoke of themselves as the mass of the Chinese did with reference to the Han dynasty which began 200 years before Christ. The central kingdom was originally the province of Shan-si. That was the seat of a sovereign who had certain privileges almost pontifical, and he was done homage to by the surrounding principalities. About 200 years before Christ that dynasty was overthrown, and the principalities were overthrown in succession, and governed under one chief, who was spoken of in history as the first emperor of the whole empire, but he did not rule over anything like modern China Proper, nor was Kuang-tung incorporated in the empire until six centuries after Christ. While the men of the other provinces spoke of themselves as men of Han, the Cantonese always spoke of themselves as men of Tang. He did not quite go the length that Mr. Baber did with regard to the languages of the provinces. The people spoke with such a dialectic difference that those of one province did not understand those of another. Even the Fokienese and the Cantonese who were next-door neighbours did not understand each other. But the idiom of the different provinces was radically the same. The language of the Government, which we call the mandarin dialect, was learned by the whole empire, pretty much as French in former times was learned throughout Europe. The idiom of the Cantonese was in some respects more classical than that of the more northern provinces. There could be no doubt that the population of China was formed from several races, but he was not prepared to hazard any conjecture as to the forthcoming of those races. There was fair ground for believing that Shan-si, which eventually became the chief among the states, was founded by immigrants who slowly acquired the supremacy over the adjoining countries, not generally by force of arms, but by the force of their civilisation. He believed that the permanence of the empire was due to moral causes, among which was the fact that from a very early date, they adopted a uniform system of education; whether that education touched upon history, poetry, or politics, it was really uniformly of a high moral character. The books which were collected and re-edited by Confucius and which

had been the backbone of Chinese education ever since, whether they treated of metaphysics, or history, or of administration, or of ceremonial, all pivoted round high moral principles, and these were expounded with considerable simplicity. Mr. Baber had gone further than he (Sir Thomas Wade) could go in his estimate of the influence of Buddhism upon the Chinese mind. In his opinion the tendency of Buddhism in China was to emasculate to a considerable extent the doctrines of Confucianism. Its purpose being to lead men to avoid that which was evil, it had taught men to avoid everything whatever, or to attempt to do so, and the consequence was that one of the grand desiderata of the Chinese mind was that no mischief should come nigh to him, that he should lead a sort of happy-go-lucky life and rather desist from all labour, than come in the way of any harm. The chief blessings were longevity, riches, completion of the number of their days, and freedom from everything that would trouble them. He attributed to this latter the great tendency of the Chinese to opium-smoking. It might be thought that that was an extraordinary leap to a conclusion, but what endeared the opium pipe to the Chinaman was the certainty it afforded him that he would put away all discomfort. He quite agreed with Mr. Baber that the commercial prospects in the north-west corner of Yun-nan were exceedingly small. Yun-nan was a large conglomeration of highlands which had of late been afflicted by a rebellion which was not, in any respect, an offshoot of the other, and he had no expectation whatever that any commercial advantages could soon arise from communication with that province. The entrances from the west side into Yun-nan were those which were generally spoken of, but there was a way across the mountains from the north-west corner of the provinces, known as the "Iron Gate," certainly deserving of attention in the interest of geography if not of commerce. It was about 150 miles, as the crow flies, from Sadiya, and was the point for which Mr. Cooper started in 1867. Mr. Cooper made all his arrangements to go in company with a Romish mission, but there was some disagreement, and he eventually went off upon the old beaten track. He hoped that either Mr. Colquhoun, or some other enterprising member of the Society, would find time to follow up that route.

Colonel YULE said that the anecdote which Mr. Baber had related of the question put to him by a Chinese girl whether he was a *Pi* or a *Tan* might seem eccentric and absurd to them; but if 200 years ago a Chinese Mr. Baber had been giving an account of a visit to England before a Chinese geographical society, he might have said that he had been asked, "Are you a Whig or a Tory?" Probably no dictionary then existing would have enabled him to understand what the terms meant—they were quite as eccentric in origin as *Pi* and *Tan*; but possibly he might have found out that the word "Whig" meant "sour whey," and "Tory" "an Irish brigand"! The want of homogeneity in the Chinese empire was very much the same thing as was seen in India. India, like China, was regarded as an unity, but the fact was that there was even less homogeneity there than in China; still there was a certain Hindu influence difficult to define, which had given the whole country a certain character of unity, and no doubt the case in China was much the same; only the unifying social influence in China had more of a political tinge, and in India more of a religious tinge. Mr. Baber had spoken of the impossibility of conveying the doctrines of Christianity in the Chinese language, but, be that as it might, no one could read the account of missions in Che-kiang by the speaker's friend Bishop Moule without feeling that there was a heart in the Chinaman that was capable of accepting and imbibing Christianity in all its essential aspects.

Mr. COLQUHOUN said the bright and valuable paper read that evening brought out with great vividness—as whatever Mr. Baber had to tell us always did—much new information regarding China. Justice had been done by other speakers to the

general value of the paper. As a traveller recently returned from Western China, where he traversed the same ground as Mr. Baber, from Tali to Manwyne, he could bear testimony to the accuracy of Mr. Baber's observations. The few remarks he had to make would be restricted to the question of the development of our trade with South Yun-nan and the Shan country. The information gained on his late journey enabled him to assure Mr. Baber that South-west and Central Yun-nan would amply repay any efforts which we may make towards trade extension. It would compare favourably with Burma, which had proved such a fertile field for our trade. The soil is not only rich, but the mineral wealth is great. The population is greater than exists in British Burma even to-day. Yun-nan, like the Shan country, owing to the want of all communications, is veritably a "cut-off" region. The great rivers which intersect it are impracticable, and the only way to get at it is by means of a railway. The Americans have the courage of their opinions in the matter of rail communication, and in face of the thousands and thousands of miles of rail which they are laying down in Mexico and elsewhere, surely a line of under 600 miles is no very wonderful undertaking. Once connect the South China border with British Burma and Siam, create an external demand, and not only will the natural productions of the country at once rapidly increase, but British goods—now found only here and there in small quantities—will be discovered for sale everywhere. He quite agreed with Mr. Baber that *the* approach to South-west China is from British Burma, through the Shan country. He would here point out the large extent of the region inhabited by the Shans. It includes the whole of Indo-China lying to the south of Yun-nan, bounded on the west and east by the Burmah and Anam main ranges of mountains. It extends over no less than 340,000 square miles, of which 80,000 belong to the Independent Shan country and 260,000 to the territories of Siam. Little is known regarding the greater part of this region. In the Independent Shan country there are probably at least three million inhabitants. The Siamese records give six million as the number of able-bodied men in their territory; but this, according to Bishop Pallegoix and M. Mouhot, does not include either old men, women, or children. If an opinion can be founded upon the Siamese census, the population would be probably some 30 millions. This, no doubt, is in excess of the real facts. That the country is *not* sparsely peopled, however—even in the less fertile portions—appears from the narrative of M. Mouhot's journey. He tells us that one province, viz. Korat, alone contains, besides a number of villages, eleven towns, some of which have 50 or 60,000 inhabitants, and in a stretch of 200 miles north of Korat he passed sixty villages and six towns. The country examined by Mr. Baber in North and West Yun-nan is very different, as pointed out by him (Mr. Colquhoun) before this Society, and more fully in his work 'Across Chrysê,' from the central and south-west portions of Yun-nan. In opening up the Shan country and North Siam by means of a railway we shall reach the richest part of Yun-nan, peopled mainly by the Shan people, a friendly, industrious, civilised, and lettered race. This Shan highway to China has the immense advantage of passing through a country whose inhabitants are not only friendly but who are "a race of pedlars." The results obtained in Burmah encourage us reasonably to hope for very great results in the Shan country.

The PRESIDENT, in proposing a vote of thanks to Mr. Baber, said that China had done a wonderful work in conquering and assimilating various regions within which its population was placed out, but it appeared to be singularly deficient in the power of propagating its influence elsewhere. As soon as its people emigrated they simply became the workpeople of others, and carried with them no intellectual or moral influence. It seemed as if they were doomed to stagnate, and although

Confucius might have been a great man, he did not exercise an influence which, in the words of a previous speaker, "authors of other religions might envy," because his philosophy had produced the absolute stagnation of upwards of 260 millions of people. The characteristics of those people appeared to be stereotyped, and perhaps it was fortunate for the rest of the world that such was the case; for what would happen if those inhabiting China were endowed with the same spirit of ambition and progress as the 36 millions of the British Islands, the inhabitants of which ruled over 300 millions in other parts of the world, and gradually introduced among them the influences of European civilisation?

A Journey from Mossamedes to the River Cunéné, S.W. Africa.

By the Earl of Mayo.

(Read at the Evening Meeting, June 11th, 1883.)

Map, p. 504.

I left Liverpool in s.s. *Benguella* on the 27th of June, 1882. Mr. H. H. Johnston was with me, and my servant, Paul Kelly. We arrived at St. Paul de Loanda, the capital of Angola, on June 9th, and found we were too late to catch the Portuguese steamer going south to Mossamedes; but through the kindness of the Admiralty at home, I was enabled to get a passage in H.M.S. *Rambler*, and on June 22nd we dropped anchor in Little Fish Bay, off Mossamedes. Mossamedes is a pretty little town, built of white stone, on the shores of the bay, with an esplanade of palm-trees running along in front of the houses. The country to the east and south is a complete desert. We found that waggons had come down to meet the Portuguese steamer that had arrived here from Lisbon on the 8th, but had again gone up the country; so here we were, stranded on the coast, with no possible means of reaching, except by walking, the new Boer settlement Humpata, which I intended to make my *pied-à-terre*. That very afternoon I despatched letters to Humpata to three people there, entreating them to send down waggons to take us into the interior, with our goods and baggage.

While waiting for our means of starting into the interior we made a little trip to the river Bero, lying north of Mossamedes, the valley of which is most fertile, supplying Mossamedes with fruit and vegetables, cotton, Indian corn, bananas, sugar-cane, cassada, oranges, &c. We only stayed one night in the valley of Bero, where we were most hospitably entertained at a Portuguese fazenda.

After this, as there was no chance of the waggons coming down yet a while, we decided to make a journey to the river Coroca, which lies south of Mossamedes, the route being along the coast. Accordingly, having borrowed a small bullock-cart and hired six oxen, on the 27th June, at a quarter past two in the afternoon, we started.

Turning our backs on the little town of Mossamedes, we crossed the level tract of desert, and ascending the high ground reached an open plateau. The route then lay across a dry stony tract, and the course was nearly due south. One first crosses a plain covered with prickly euphorbia of stunted growth, and further on, as it becomes more arid and more desolate, quantities of that extraordinary plant, the Welwitschia, are seen, and a few tufts of scorched grass. During the march there were no animals noticed; perhaps a black and white crow or a lark might flit across the track; all else was desolation.

We travelled all night, walking, and riding by turns in the little bullock-cart, which jolted one's bones most dreadfully, and the morning of the 28th June still found us plodding over the desert. Before the sun rose, the whole landscape was enveloped in *cacimbo* or mist, which is so peculiar to these latitudes. The mountains of the Serra de Chella might be seen far away in the east.

The route on the 28th was diversified by crossing a few dry water-courses, and the ground gradually fell until we entered a narrow gorge, which was desolate, sandy, and arid. About two o'clock in the day we came across the dry bed of a lagoon, a portion of which to the west of our route was filled with water, with a house on the far side; this was one of the farms on the river Coroca. The day ended by my going to one farm and my companion, Johnston, to another. We had been marching from half-past two one day until sunset the next—a terribly fatiguing journey, with little or no rest in the jolting cart.

No water is procurable on the route between Mossamedes and the Coroca for either man or beast, nor is any fodder to be obtained during the dry season. There is a shorter route closer to the sea-shore, but the sand is too heavy for waggons. The river Coroca, on which the farms are situated, rises in the spurs of the Serra de Chella, and here takes a sudden bend to the north, afterwards flowing nearly due west to the sea, which, in a straight line from the farm at which I stayed, is about 14 or 15 English statute miles. We used to get fresh fish brought up from the sea, at Porto Alexandre, by the Croque natives, for our breakfast.

There is a lagoon, lying east and west, about two miles in length, close to the fazenda São João do Sul. It has not been marked in any former maps, although it has been known to the Portuguese for centuries. Of course this lagoon, which is supplied by springs, and never dries up, plays a very important part in the cultivation of the Coroca farms. It is not the river Coroca itself which supplies the water to the farms, but the lagoon, for during the dry season the Coroca is simply a sandy bed, with no water visible. I fixed the position of the Fazenda São João do Sul, lat. 15° 54′ S., long. 12° 4′ E., on the right bank of the river Coroca, and find it agrees with Capello and Ivens. Except

around the lagoon, all is a desert. This is indeed a sandy and dry country. Herds of zebra are found some 15 miles away; while here I shot a springbok, ducks and teal on the lake, purple porphyrio and jacana, and I saw numbers of grey geese. We returned to Mossamedes by the same route, and scarcely half an hour's walk from Mossamedes I saw five springbok (*Gazella euchore*).

On July the 8th the three waggons I had been waiting for arrived from Capangombe, and on the 9th we started for Humpata, viâ Capangombe and the Sierra de Chella. The tribe that people this region, that is from Mossamedes to Capangombe, at the foot of the Sierra de Chella, are Mundombes. They have a language of their own, belonging to the Bantu family. They are not good or expert hunters, as some writers have described them. One could scarcely call a man a good hunter who uses nothing but a bow and an arrow, and generally misses his game. They are large cattle-keepers, and are the native porters who carry travellers' luggage as far as the top of the Sierra de Chella, above Capangombe.

We trekked from the river Bero, half a mile from Mossamedes, where the oxen were, at 5.30 A.M. on the 10th. The main road turns due east and ascends a sandy hilly veldt. There is no water until one reaches Giraul; then the oxen have to be driven nearly a mile and a half to the water. After leaving Giraul, there is an ascent by a well engineered winding road; one indeed might imagine oneself on one of the post roads on the Alps. The perpendicular faces of the high masses are covered with an efflorescence of almost pure sulphate of magnesia. This formation is succeeded by massive basalt. This narrow slip of basalt is followed by quartzose rock. This changes to quartzose granite, and in some places to fine-grained porphyry. At this time of the year but little vegetation was to be seen, and all the landscape had a burnt and cindery appearance. After the ascent from Giraul, one arrives at the second plateau. A large plain lies in front covered with granite boulders. The granite formation of this district is very peculiar.

The next stop is Pedra Grande, so called from a large peaked mound of solid granite. On the left-hand side of the road deep cavities in a massive rock hold water during most of the dry season, but at this time of the year there was not a drop, and a deserted, roofless house lent a ghastly appearance to the desolate scene.

In African travel it must be remembered that where there is no water one has to travel continuously, and the big waggon and tired oxen go lumbering and jolting along. We rested here and cooked some food in the deserted house, and then on again to Capangombe.

After leaving Pedra Grande, the road winds among rocky hills. More vegetation is met with, and a more mountainous country is passed; numbers of springbok were seen, some standing on their hind legs, cropping the short umbrella-shaped mimosa bushes. Pedra Provi-

dencia is passed, and in the cleft of a rock, on the right of the road, good fresh water is found, but it is so deep down and the aperture is so small that the oxen cannot get at it.

Our next stop is at the Munhino. In this district there are some few farms on each side of the road, and in fact we are in the land of cotton and cultivation. The vegetation that fringes the river Munhino, which during the dry season is simply a streamlet, is dense, and game is abundant. Koodoo (*Strepsiceros kudu*) and other antelopes are found. In the rainy season, elephants are sometimes seen.

At last, on July 13th, we reached Capangombe. There is a small Portuguese fort here, which is simply a barrack square surrounded by a wall; there is a store with little in it, and the Portuguese who keeps the store contracted to send our luggage by means of the Mundombes to the top of the mountain—a labour which we learned would take some seven days. The Serra de Chella now rose straight before us, and in the distance, nearly due east from the fort, we could see the gorge in the mountain up which winds the path.

I walked up to the top of the mountain and camped, in order to receive over the baggage as the Mundombes day by day toiled up with it. I may mention that Capangombe is an unhealthy place; the Boers who visit it as a rule get fever. My servant Kelly was very bad with it some six days. The thermometer at 3 P.M. at Capangombe stood at 77½° and at night 49° Fahr.

Erickson's Camp is the Boer name for the camping-place at the top of the Serra de Chella; I made its altitude 5400 feet above the sea; the thermometer marked 71° during day, and during the night 38½° Fahr. This is the mean of different readings. I fixed the position of this place as in lat. 15° 8′ S., long. 13° 40′ E. I passed a dull week here, being most of the time completely alone. The lowest reading registered while in South Africa was at this camp on July 27th, viz. 31°. There was a frosty rime on all the baggage piled round the little tent when I woke in the morning. I saw numbers of francolin partridge here.

I passed from Capangombe to the summit of the Chella three times. The views were truly splendid. After leaving my little camping-place, the winding rocky path discovers at a sharp turn the second plateau lying at one's feet and visible through the high bluffs that form the practicable gorge in the mountains. The little barrack square at Capangombe is easily discernible and the hot mist veiling the landscape lends distance to the outline of the hills and mountains stretching towards Pedra Grande. The path down is wet with a mountain stream in which water-cress grows in abundance, birds are chattering everywhere, before the morning sun has lighted up the gorge. The box tree is found at this high altitude, and also buttercups; and as one descends, a little waterfall, to the right of the path, tumbles over the rocks amidst long creepers and dense vegetation. Rubber gum of a poor description

is gathered in the little glen which is now reached. This valley is some two miles long and scarcely half a mile broad from cliff to cliff; about the centre of it is a small farmstead called Chella, where excellent bananas, and the best oranges in the province of Mossamedes are grown; they can be had for the asking.

Passing through this fertile spot I came upon a rocky path where a flock of pluto monkeys were seen scuttling away to the dense bush, and I very nearly stepped on an African cobra, which raised its hooded crest and hissed and glided away. On reaching the foot of the gorge one finds the farm of Bruque, where cotton is chiefly grown, after which a walk along the dusty waggon road through a forest of trees, and the wall of the barrack of Capangombe soon comes in sight.

The waggons that had brought us from Mossamedes remained at the foot of the mountains. The oxen were driven up to Humpata, and on July 27th appeared again with three other waggons. We reached Humpata from Erickson's Camp about 11 at night, the disselboom or pole of one of the waggons breaking *en route*, delaying us. The cost of bringing our goods from Mossamedes to Capangombe, all included, was 45*l*. No oxen died on this route as they very often do.

Humpata, the new Boer settlement, had been established some eighteen months when I arrived. The Boers, with their wives, children, and cattle, had trekked from Pretoria in the Transvaal, and took seven years' wandering to reach this place. They were already living in comfortable little thatched cottages, with stone and mud walls, and all were most kind, obliging, and hospitable. Taking them all round, a finer set of men I had rarely seen; without doubt, during that terrible seven years' journey it was a case of the survival of the fittest. The whole account, written by Mr. W. W. Jordan, is given from a Cape journal in my report on Ovampoland, now in this Society's Library. The little cottages at Humpata are scattered about on rolling downs. To the north mountains rise up, and to the south the ground gradually falls till near Huilla, which is on the second plateau. The temperature is the same nearly the whole year round, and a healthier place I cannot well imagine. Two streams water the many Boer farms lying around, and a cleverly constructed canal with many branches brings water within reach of all the cottages and gardens.

On July 31st we left Humpata for the river Cunéné. The first thing that happened was that one of the waggons stuck in a muddy irrigation channel just outside Humpata; we had to dig it out. We reached Huilla the next day. It is a Portuguese military station situated in a fertile valley with a muddy and deep stream running down it; the position is fixed by Dufour in 15° 2′ 4″ S. lat. This is the headquarters of the Roman Catholic Mission, and here I had the pleasure of meeting Père Duparquet, who has given to the world so much information on the river Okavango and the tribes of Ovampoland. The Mission at

Huilla is flourishing; they are building a college for pupils from St. Paul de Loanda, and Huilla is a healthy and pleasant place to reside in. The tribes that inhabit the country around Humpata, Huilla, and three days east of Huilla, Jau, Quita, and Hahé, are Munhanecas and Quipongos. They are great robbers, and speak a dialect belonging to the Bantu family. They are cultivators, tilling the soil in common; they keep some cattle, and move the site of their villages and cultivation every now and then as the ground becomes poor and worked out. They are armed with the usual poisoned arrows, assegais, and knobkerries, and those that can afford it have a Portuguese flint musket, the usual common trade pattern. They are dirty, and I should say never wash themselves; much like the oxen they tend, they are wanting in either great virtues or excessive vice. In fact, I may say that these characteristics apply to all the tribes I met in this my first journey in South-western Africa.

The Portuguese military post at Huilla is manned by twenty-five black soldiers, natives of Loanda. All the soldiers are drawn from that part of Portugal's colonies, and they run away when a gun is pointed at them. Since the Boers have come into the country all has been quiet. There really was not much fighting or war before they came. There are two small avenues of eucalyptus trees at Huilla planted by the Portuguese.

On Aug. 2nd we left Huilla and stopped at the Quinpampanini river, called by the Boers Commandant's Drift. This is the last Portuguese farm before reaching Humbé near the Cunéné. All now is bush, forest, mountains, and native villages. The road descends from Huilla, and winds through a forest of many species of wild fig-tree. At Commandant's Drift, on the right bank of the stream, there is a dense bush forest stretching south. This stream lower down is called by the Boers the Honey River, and they say numbers of rhinoceroses are found in the neighbourhood. I saw koodoo, eland, duikerbuck, and waterbuck. There are small crocodiles in the river, the water of which is beautifully clear, running over a rocky bottom. Bagrus and small fish abound in this stream. I consider this place to be eminently fitted for a permanent camp during the dry season. The Portuguese farmer supplies excellent vegetables, eggs, and fowls, and game on the river bank and down the river is fairly plentiful.

On Aug. 6th we left, travelling on through the bush till we reached the open district of Hahé, a rich corn country. Here we laid in a store for my two mares. Zebra became plentiful after passing the cultivated tract. We still travelled on through mopani scrub and over sandy, stony soil. We had some little sport, and a Boer who was with us shot a zebra near a halting-place which the Dutch call Palmett Fountain.

On Aug. 11 we were approaching again the same river, called at this part the Gambos river. At the Drift the river is about 25 feet wide and

4 feet 6 inches deep during the dry season. I saw a large herd of eland (*Oreas Canna*) on the marshy plain through which the river winds, but did not get one. A most beautiful group of very large mimosa trees, one of the many species found in Africa, stand on each side of the track before coming on to this plain. The next day I shot an eland.

On Aug. 15th we moved along the waggon track, through leafless mopani scrub. We stopped for breakfast in a field of Indian corn, cultivation having commenced again. Mr. Johnston and the Boer rode to Gambos Fort, a Portuguese military stockade on the right bank of the little river which we have never been far from since leaving Huilla. After leaving the vicinity of Gambos Fort we passed a conical shaped rocky hill covered with bush, called by the natives Otchivemba Mountain. It stands west of the track, between the river and the road, as one goes south. This mountain is a great landmark coming up from the Cunéné, and is seen nearly two days' journey distant.

On August 18th, having ridden on in front of the waggons, I shot two doe impala antelopes (*Æpyceros melampus*). I got back to the halting-place after dark, and as the Boer advised me not to fetch the meat that night, I let it lie. The next morning, on the waggons passing the spot, scarcely a vestige of the antelopes was to be seen; the hyenas and jackals had devoured everything, even the hoofs, and a torn ear and the trampled sand alone showed what a meal they must have had.

On the 21st we arrived close to the hunting-ground. A number of Boer waggons passed us, having been down to the Cunéné to kill hippopotamus for the sake of their fat, which they make soap of. On this day I moved on to Owithya, which was to be my permanent camp during the most of the hunting season. All the country on leaving the river is excessively dry and parched, although pools and pits of water are scattered about, which are much frequented during the dry season by elephant and all other game. On the 22nd I shot a duikerbuck antelope (*Cephalophus mergens*); both this and the steinbuck (*Nanotragus tragulus*) are excellent and tender meat, but rather dry at this time of the year.

In one of the pools of the stream, near my camp at Owithya, I caught two Bagré (*Bagrus*), a siluroid fish which attains in the large rivers of Africa a huge size, sometimes six feet long. One of those I caught weighed 3 lbs. I also caught a number of carp-like fish, about half a pound each. There was any amount of game in this country, which stretches towards the mountains, a continuation of the Serra de Chella. I killed giraffe, koodoo, gnu, duikerbuck, steinbuck, zebra, hyena, Roan antelope, wart-hog, also numbers of francolin, guinea-fowl, and sand-grouse. We heard lions roaring at night-time, but never saw one.

While here I made a trip with one waggon to Fenter's pits, and went out shooting with his sons; they killed two bull elephants the morning of the day I joined them. This country is sandy, with large patches of

mopani bush. Around our camp were numbers of baobab trees, and a beautiful grove of these enormous and, at this season, leafless giants of the forest lay due west of the tent. The red orb of the setting sun going down amongst these was a glorious sight. I also went over to Erickson's camp; this was close to the track and the route cut by my hunters through the bush, and was rocky and bad travelling. There are water-pits on the way, where one stops for the night. I found two Englishmen staying at this camp, as well as Albert Erickson, Mr. Axel Erickson's brother. We went shooting together, and exchanged hospitalities at our separate camps; in fact it was a very pleasant time. Game was in abundance, and the climate very healthy.

This is the first year *any* white men have penetrated into this district. The tribe inhabiting the part near the mountains are Chibiquas; they are essentially hunters and cattle-keepers, having originally migrated some 150 years ago from south of the Cunéné. They belong to the Damara race, intermixed with Ovampos and other tribes before mentioned; and they speak a language resembling that of the Ovampos.

This year the Hottentots made a raid across the Cunéné, broke up the Chibiquas' stockaded village, and now this latter tribe are scattered about among the villages and country nearly reaching to Gambos fort. I came across a large party of them when hunting; they were camped in a circle, and living in round gipsy huts made of boughs and leaves, there being a screen of the same materials in the centre of the encampment, which I imagined to be the main guard, as numbers of the men's weapons and poisoned arrows were hung up. They were a little shy of a white face at first, but my Ovampo boy set matters right, and I dismounted and examined their impromptu guard-room.

They had some very curious flat-headed iron instruments with which they prod at the elephant, severing the muscles above the hind feet, and so bringing the beasts to a stand-still, when they kill them with assegais. I saw no firearms of any description amongst them. They were indeed the savage pure and simple, both men and women wearing beads and the usual small leather apron round their loins; beyond this they had nothing on. The men were fine-looking fellows, the women ugly.

One day, when at Erickson's camp, I rode over to Bird Fountain and climbed up a rocky coppie or hill, to see the view. To the north the mountains of the Serra de Chella stretched far away towards Bruque and Capangombe; under my feet lay the dense and thorny African bush, with rocky hills cropping up here and there to the west; and on my left the country got more dry and desert-like, and the flat-topped hills, so peculiar to the sandy district near the sea-shore, were visible. It was the first year the eyes of the white man had gazed on this unknown country, the home of the elephant, the ostrich, and the oryx. All the landscape had a dry and parched appearance.

About October 12th we had our first thunder shower, signs of rains

beginning, and the number of Hottentots and Griqua hunters gathered round my camp at Owithya, began moving away to snugger quarters. Most of these men were in Mr. Axel Erickson's employ, and the grass being good and water plentiful my camp this year was the centre of operations; at one time there were nearly two hundred white men and black, their wives and families included.

On October 14th the Boer appeared from Mossamedes with my mails, and on the 18th we started for Humbé and the river Cunéné, recrossing the little river, the road keeping close to its banks, over hard and dry ground with deep cracks on its face. My servant killed a fine specimen of the *nhamba*, a deadly snake, which was occupied in trying to slay a small squirrel in a high mimosa tree.

Before reaching Humbé we passed a Portuguese settler's home; this district is thickly inhabited by Ovampos, who are little different from those living south of the Cunéné; in fact, as Père Duparquet stated to me, he cannot see any difference between the tribes near the north bank of the Cunéné and those living south in the so-called Ovampoland. I have seen natives from the south: they are the same in dress, language, and manners and customs. These North Ovampos speak a dialect of the Damara language, and cultivate each hereditary farm separately and not in common like the Hahé and Huilla natives; they will not willingly sell their land; they possess plenty of cattle and goats, and take care of the natural fruit trees of the country, which, with Indian corn, form their staple food. Indian corn is the food of all races in this part of Africa. Boers, and the poorer Portuguese eat large quantities of it. Bananas and oranges are a cultivated luxury, and the poorer natives seldom get meat, except as hangers on to a European camp, where they become hewers of wood and drawers of water and return in a short time to their villages strong and well loaded with the dried meat of antelopes, giraffes, &c., which they have saved up. I found all natives during my journey quite peaceable, very much frightened of the horses, for before the Boers came into the country, some eighteen months ago, they had never seen a horse; a mounted man makes them run away, but they are now beginning to be accustomed to these animals, especially the villagers living near the waggon track in which we are travelling, and which is the one made by the Boers on their journey from the Transvaal to Humpata. This district so thickly inhabited is covered with large baobab trees.

On the night of October 19th, by the light of the full moon, we drove our waggons into Humbé (fixed by Dufour in 16° 50′ S. lat.), camping under a large wild-fig tree in a mealie field, not far from the Roman Catholic mission-house. The next day I went to see Fathers Hogan and Lynch, who have charge here; they were much pleased to get papers and news from England. On the 22nd we left Humbé to go up the Cunéné towards Ekamba, for hippopotamus and Lechwe antelope

shooting; we travelled by moonlight and camped amidst some thorny trees covered with white sweet-smelling flowers; there were little or no leaves on the trees. We moved on the next day to a long narrow lagoon where five hippopotami were disporting themselves. I shot near here two large crested cranes; they were excellent eating. We travelled along a grassy plain which borders the banks of the river, which swarms with crocodiles, and is about here not 40 yards wide. During the rainy season the whole of this plain is inundated, the high-water mark being clearly discernible around the trunks of the trees. The waggon track keeps close to the thick forest, which borders the plain and runs parallel with the river. On leaving Humbé, at this time of the year, one sees vast herds of native cattle, which are driven from the villages situated in the bush, to graze on the new grass which is now beginning to spring up. There are numbers of pools and small lagoons on the plain, which swarms with Egyptian and spur-winged geese, red-billed teal, duck, blue crane, and crested crane. After leaving the cattle district, herds of Lechwe antelope (*Cobus Leche*) are seen; this rather rare species swims like water rats with its nose just above water, on the least alarm rushing into the thick reeds which border the river bank; their feet are longer than those of the impala, and they are considered a much shyer animal; their meat is good eating. I shot two does and two bucks while on the Cunéné, and unluckily my boys lost the fine horns of the buck; I brought home, however, three skins of this beautiful antelope. One of the two hippopotami which I shot at a lagoon on this plain, was yoked next morning to a full span of oxen and towed ashore; the oxen trekked him right out of the water, the boys shouting and sitting on the huge carcase as it scraped along over the grass. The flesh is like coarse pork and the fat excellent. The natives of the adjacent village of Ovampos had a great feed and little was left for vultures or jackals.

The Cunéné is a much smaller river than many would imagine from its appearance on the map, and the reports that have been received of it. A good deal further up the river from where I was, Mr. Jordan informed me that it was navigable, but at the place where I saw it, and at that season, it certainly was not navigable for large boats. At its mouth there is a bar, which totally prevents any vessels from entering the river. In fact, a Portuguese naval officer who was employed about five years ago in exploring that part, told me that it was scarcely passable on a plank. Some 70 miles above its mouth there are rapids, I might almost say cataracts, and much further up there are large falls, evidently where the river pierces the continuation of the Serra de Chella. Little is known of the river between Humbé and its mouth. The Boers have visited this part, and say that hippopotami are plentiful, and elephants are found in numbers among the rocks and mountains along its banks. Hunters this year penetrated through the mountains to within about

30 miles off the large cataracts, and the horses being unshod, their hoofs were completely worn down, and they had to hunt on foot. For further information as to the mouth of the river, I may refer my readers to a journey of Fernando da Costa Leal in 1854, recorded in Petermann's 'Mittheilungen,' vol. iv. (1858) p. 412; and also the Portuguese Expedition of 1878, reported in the Lisbon 'Boletim da Sociedade de Geographia,' 2a Serie, No. 1 (1880), p. 1. It is a great pity that the river cannot be entered from its mouth, as it would open up that part of the country to a great extent.

While we were on the banks of the Cunéné the rains began, and heavy thunder showers during the day soaked everything through and through. I here lived in my waggon, and did not pitch a tent at all. The natives used to bring us round orange-coloured fruit of a species of strychnos. They were excellent eating, and, mixed with dried apple-rings, made a good tart.

On Oct. 30th we moved up to the chief's village at Ekamba. He lived with his wives in a cluster of houses within two rings of stockades. After some delay he received us, and we found him a particularly shaky old gentleman, much addicted to trade rum. The women of this tribe wear a most curious arrangement of the hair above the ear, stretching it in a circle so that it has the effect of a large butterfly on each side of their head. The chief paid me a visit on the following day, and I gave him an Enfield rifle.

Both the hippopotami mentioned were shot from one of the two Berthon collapsible boats which I brought with me. The boat was capable of holding two people comfortably, as well as guns and ammunition.

After stopping at the chief's village some three days, we moved back towards Humbé, on our old track. The rains had now really begun; the grass one could almost see growing, and all around was becoming quickly green and rank. I deemed it prudent to leave the river, as the waggon boys, who always bivouac, were getting wet through of a night, which means fever and ague.

On Nov. 11th I rode into Humbé, intending to bring my waggons back to Mossamedes in time to catch the December Portuguese mail for Lisbon. However, I was laid low with severe fever and rheumatism at Humbé from the effects of a wetting while shooting on the Cunéné. All colds turn to fever in this climate. The Roman Catholic missionaries nursed me with the greatest care, and quinine soon set me right again.

On Nov. 25th I left Humbé convalescent for the coast. The rains had now begun in earnest. The face of the country was completely changed. The mopani bushes were covered with their bright emerald green leaves, and the forest had become dense and dark; beautiful flowers decked the grass, and the delicate amaryllis hung in clusters, the waggon crushing them as it lumbered along.

I will not repeat myself as to the journey back; suffice it to say, that two hired Ovampos ran away, and at Gambos river one of the waggon boys was down with bad fever, so I had only a man and a boy to drive two span of oxen. The lions got in amongst the oxen one night, but the boys lighted fires and drove them away.

I find the following entry in my journal:—"Franz still ill. Shalckveldt, my head waggon-driver, says he feels bad; if he goes down we are done"; as then the only person to drive and tend twenty-eight oxen would have been a boy of eighteen (Henry). After many delays and stoppages, waggons sticking, and then having to be unloaded, wet nights, and damp firewood, we reached Commandant's Drift, and fresh eggs and fresh vegetables were indeed a great luxury. On our arrival at Huilla I found the missionaries had nearly completed their college. Some eleven or twelve pupils have already arrived there from St. Paul de Loanda. The bishop of Loanda was shortly expected.

On the 14th November, after being drenched through and through by a heavy tropical shower, I rode up to Mr. W. W. Jordan's store at Humpata. I was glad enough to get back to a house and some little comforts, in fact as much as the kindly Boers and their wives could offer me. The waggons arrived the next day.

My journey back to Munhino from Humpata was by a different route, through the wildest part of the mountains. A fairly engineered road is being made by the Portuguese Government for the use of the Boers and their waggons when going to the coast. This new route as far as Munhino has abundance of water and grass for oxen, cattle, and horses, all of the best description. Game is not plentiful, and the mountains are quite impracticable on horseback off the road.

I think it may be interesting to future travellers to know the casualties, accidents, and sickness that happened to my party during my South-West African journey. On the return journey from the Coroca, one of the bullocks succumbed, but I believe did not die. At Capangombe, on the way to Humpata, my servant Kelly was very ill with intermittent fever, but quinine and change of air to the high plateau soon cured him. While hunting at Owithya, my chestnut mare, Pop, fell with me and broke her neck. We also lost one ox from sickness here. On the Cunéné I caught cold which turned to rheumatism and severe fever; but on moving away from Humbé, which is rather unhealthy, I soon got well. Shalckveldt, my head waggon-driver, and Franz, another waggon-driver, had for a short time severe intermittent fever on our way to the coast. On their arrival at Humpata, on the third plateau, they soon got well. None of these cases lasted more than ten or twelve days in their bad form. I found calomel in five or six grain doses, followed by quinine, to be the best remedy.

The total length of my journey in South-West Africa outward was

516 English miles; and I was ten months and two days away from Liverpool.

The following discussion ensued on the conclusion of the foregoing paper:—

Mr. Francis Galton said few persons present could have looked forward to the results of Lord Mayo's journey with greater interest than he (Mr. Galton) himself did, because it was his fate some thirty years ago to be travelling very near the same district, and in his exploration of Ovampoland and Odonga he reached a point about five days' journey from Humpata. During that journey, being familiar with the vast desert of Western Africa, the idea of an ever-flowing river filled his imagination, and he looked upon it as the great bourne to be reached, though he was not fated to reach it. His interest in the country had been kept up by many facts. One was the death of his companion, Mr. Andersson, who returned to the country and travelled there on many occasions. He reached the Cunéné worn out with disease and there died. The river was also reached by Mr. Hugo Hahn, a missionary, to whom he (Mr. Galton) was indebted for many acts of kindness. Mr. Green, a well-known elephant hunter, travelling from the south, also got as far as the river, and so had many others, but in no case had a full description of the river been given—such a description as no doubt Lord Mayo would give in a fuller account of his journey. There were many points of extreme interest in Lord Mayo's paper. The first was the confirmation of Sir Roderick Murchison's well-known theory of Central Africa being a basin bounded by high ramparts, through which the various rivers broke. Lord Mayo found two great chains, one 2000 feet high, and the other higher. As the height of the second was only obtained by an aneroid it would be advisable to hesitate before accepting the particular height mentioned, which seemed to be excessive. Of course it was well known that aneroids were liable to play all kinds of tricks, but if Lord Mayo's instrument after being tested in England was proved to have no index error the calculation must be accepted. The existence of the ramparts to the north and the south was previously known, and Lord Mayo had supplied the missing link. The two ranges converged into one further south, and at Walvisch Bay only a single ridge could be noticed—an ascent of 4000 feet leading to the higher plateau. Allusion was made in another part of the paper to the mist on the lowlands. The peculiarity of this coast was that a south polar current, chilled by the melting of the polar ice, passed upwards and hugged the coast. It was a fact that had long been known to navigators, and one which was brought very forcibly home to his own knowledge; because he happened to be one of the Council of the Meteorological Office, and on one occasion it fell to his lot to superintend the discussion of a vast number of observations that traced that current distinctly upwards. The cold was so much greater on the coast than inland that when he (Mr. Galton) returned to Walvisch Bay from the interior, at a time of the year when the sun was vertical at midday, he shivered with cold during the night, and in the daytime had to be well wrapped up. The water was exceedingly cold for the latitude, and the existence of the mist which Lord Mayo had spoken of showed that the same climate extended to Mossamedes. What became of the polar current afterwards he could not say, but it disappeared by degrees. Wherever that current flowed there was an abundance of fish, and it appeared from the paper that there was a plentiful supply of fish south of Mossamedes. It was a matter of extreme interest to him to hear of the change that had come over the country since the days when he knew it by hearsay. Dutch Boers had now found their way to Humpata. They were a marvellous race, with great power of acclimatising themselves; for certainly the Dutchmen seemed to live and thrive and multiply in regions where the English race did not thrive so well. Possibly the fineness of the men met with at Humpata was

partly due to the same cause that makes the Mormons such a fine-looking race. As a rule the Mormons were not recruited from the most stalwart persons in England, but they went through very great difficulties in reaching their destination, the weaker men died out, and no doubt the survivors were the strongest representatives. Probably the same sort of thing might account for a stalwart Dutch population being permanently fixed at Humpata. Another point that was new to him was the strong hold the Portuguese seemed to have in the country up to the Cunéné, their forts being scattered about the country, and the Catholic Missions seemed fairly established on the Cunéné itself. He had long looked upon this country, which was between 300 miles wide and 180 or 200 miles deep, as being one of the most interesting countries to explore, and he had no doubt that many facts of still greater interest remained to be discovered towards the source of the Cunéné, where the land was still higher, where immense rivers flowed in all directions, and where, no doubt, there was that greater vigour of life that might be expected in mountainous districts. He wished to pay a tribute to the well-deserved success of Lord Mayo. His journey was not undertaken rashly. Before he went he obtained from the best authorities all the materials he possibly could, and the information was printed for private circulation in a small book which formed most agreeable reading. Having laid his plans thoroughly well, he had in the short space of ten months from the time of leaving England to his return thrown very important light on a most interesting geographical subject.

Sir Bartle Frere said that Lord Mayo's paper had thrown an interesting light upon some of the important migrations of late years. The Trek Boers were seven years in passing from the Transvaal to the place they now occupied in Portuguese territory, but their travels might be traced still further back. Probably there were very few of the men among them whose fathers or grandfathers were not within living memory inhabitants of the lower part of Cape Colony. Consequent upon the emancipation of the slaves the Boers first of all travelled in a north-easterly direction towards what is now the Orange Free State and the Transvaal, and some of them reached as far as Lake Ngami. No doubt there were other gentlemen present besides Mr. Galton who recollected how Dr. Smith and General Frederick Cotton met the principal settlement of the Trek Boers not very far from the present Diamond Fields in Griqualand West. They were then moving northward. Owing partly to their desire to get as far as possible into the free wilderness, and partly to political causes, they turned north and settled in the Transvaal, where they remained for some years, till, being dissatisfied with the Government which they had themselves set up, they determined to seek the fertile country of which they had heard from elephant hunters, beyond Lake Ngami. It was some time before they ventured to cross what had been properly called the Great Thirst Land, and Mr. Vanzyl, when he was afterwards at Cape Town, attributed his success to the knowledge he had obtained of the best seasons for crossing the desert. Lord Mayo had mentioned how the great fall of rain immediately changed the whole face of the country, and enabled the Trek Boers to move with their large herds of cattle and their waggons over a country which, for nine months in the year, was utterly impassable. In this way about 300 successfully reached the neighbourhood of Lake Ngami, but many more perished by the way. In some cases almost entire families were lost, but at last about 700, including the 300 who had first crossed, reached the western borders of the desert, and turned towards Damara-land, and followed nearly the same track as Mr. Galton did about thirty years before. Finding that they were then in the neighbourhood of other Europeans who had come from Walvisch Bay, they moved northward, and about three or four years ago first crossed the Cunéné river. There was some little difficulty at first in arranging matters with the Portuguese Government,

but everybody must rejoice to hear that after all these wanderings they had firmly settled down in Portuguese territory. As a people occupying the country, and not as single travellers, they had travelled a distance of between 3000 and 4000 miles, within the recollection of many now present at the meeting. Movements such as these must in time produce great results in Africa. It must be remembered that temperate Africa did not end at the Tropic, but extended along the highlands far towards Central Africa. It was no doubt the solitary traveller or hunter who first led these families to follow their fortunes northward into the wilderness. No better illustration of the results thus produced could be found than in the fortunes of Mr. Erickson. When he (Sir Bartle Frere) was at the Cape, he was assured, on the authority of Mr. Erickson's partner, that he who as a young man started as an assistant to Andersson the traveller, had at that time sixty waggons in the field, each waggon with not less than sixteen pairs of oxen, with one or two men of European blood as hunters leading some ten or twelve native hunters, all engaged in collecting ivory and ostrich feathers, and other products of the wilderness, such as the skins of antelopes, which abounded there. He had good reason to believe that at that time the firm of Erickson had a capital of not less than 200,000*l.* employed between the Orange river and the Cunéné. Looking at these facts, there could be no doubt that there was a great future before the countries of South Africa, and the Society must feel greatly obliged to those who, as Lord Mayo had done, gave them graphic accounts of the regions they visited.

The Chairman (Sir Henry Rawlinson) asked Lord Mayo to give them some more information as to the nature and extent of the Portuguese authority. The paper mentioned a small garrison of twenty-five soldiers. That did not indicate any very consolidated authority. What was the relative position of the Boers and the Portuguese? Was autonomy allowed to the former, or were they entirely subject to the Portuguese?

The Earl of Mayo, in reply, said there was a rather strong fort at Mossamedes mounting a certain number of muzzle-loading guns, and the usual garrison of black soldiers, which, as he said before, always ran away. There were very few white soldiers, but some of the non-commissioned officers were white men. A great many of the inhabitants of that part of the country were *degradados*—men in exile from their own country. Some of them were murderers, and a great many of them thieves. When they got out there they seemed to lose all their former energy, and to relapse into ordinary farmers, though they did not farm very well. With regard to the Boer settlement at Humpata, the Boers were certainly under the criminal laws of Portugal, but they were allowed to carry on their own religious services and manage their own marriages. There was a Portuguese commandant or chef at Humpata, appointed by the Governor of Mossamedes, who was under the Governor of St. Paul de Loanda. His name was Senhor Paiva, and he was married to Commandant Botha's daughter. The Portuguese on the coast imagined that the Boers were being too well treated, and they found an excuse for recalling Paiva, but he had been reinstated. The Boers had no advantage in the way of duties on the coast. Those duties were excessive, and in fact the Portuguese had completely ruined any chance of fair trade by the fearful duties which they imposed. He himself took out some cotton goods, and the duties on them were one-third of their invoiced price. The Portuguese were very friendly to the Boers, and were very glad of their help when there was any row with the natives, because the Boers did not run away. Mr. Jordan, who kept the store at Humpata, found it cheaper to drag his goods in waggons from Walvisch Bay rather than to pay the excessive duties at Mossamedes. However, he believed the Portuguese home Government were going to make some efforts to reduce the duties, and if they did they would greatly

improve the country, as a more beautiful and fertile region could not well be imagined.

In answer to a question by a Fellow, with regard to the power that the Portuguese had of enforcing their jurisdiction over the Boers, the Earl of Mayo said they simply allowed them to settle in Portuguese territory. The Boers were not stronger in numbers than the whole of the Portuguese in the province of Mossamedes. The Portuguese farmers were naturally a little jealous, because the Boers grew better wheat than they themselves did. At Mossamedes they imported their corn from Lisbon, but Mr. Jordan hoped that the Boers would grow sufficient for all their wants.

Sir Henry Lefroy asked whether the Boers managed to take a minister of any kind, or a schoolmaster with them in their seven years' wanderings, and what their social condition was in regard to contracting marriage and training up their families like civilised people?

The Earl of Mayo said that, in order to get married, they had to go to the Commandant and declare themselves, and a record was kept of the marriage. They had no clergymen, but there were elders. On Sundays they held services, and engaged in psalm-singing. They had no schoolmaster, but some of the elder people had now established a school at Humpata. They were Calvinists, and would not send their children to the Roman Catholic missionaries; but they had a certain amount of schooling among themselves. They were not very well educated. They did not teach their children reading, writing, or arithmetic in a very systematic manner, but they knew their Bible thoroughly. They were exceedingly moral and well conducted.

The Chairman, in concluding the discussion, said the last observations of Lord Mayo and Sir Bartle Frere were of considerable interest, not merely in reference to that particular part of Africa, but also to the great questions now being agitated on the Congo, where Portuguese jurisdiction and Government, if established, might be supposed to be conducted very much on the same principles as further south. It was said to be likely that a conflict of jurisdiction would arise between the Portuguese and the French and the International Exploration party, and it was interesting to know what their relative positions were in regard to the science of government. Lord Mayo had given them a very good example of the method in which amusement could be combined with science. He had shown them how a traveller might devote himself to sport, and at the same time collect information of the greatest value both to the geographer, the naturalist, and the general student. They were all very much indebted to him for his kindness in reading the paper.

Discovery of an Ancient Map in Iceland by Baron Nordenskiöld.

On the 10th of July Mr. R. H. Major received the following letter from Baron Nordenskiöld, written in Swedish, and dated Reikiavik, June 10th, 1883:—

"Highly honoured Colleague,—Just when I had steam up to leave Reikiavik the spring of one of my chronometers broke. I went ashore to get a new spring put in, and while I waited I received the information that an old map was in the possession of one of the inhabitants of Aaden. I went immediately to him, and found that the map consisted of a fragment of a chart resembling Zeno's. The fragment comprises a piece of Greenland with the names Gui, Cher, Boier, Ther; Iceland

very complete, *without* Bres, Iscant, Mimant, &c.; England and Scotland, the latter terminating roughly without the incorrect extension towards the east. No degrees of latitude are shown in it, but compass lines similar to those on the chart of Andrea Bianco. A portion of Frisland? or Estotiland appears. I cannot, however, determine its age here.

"I have sent this important find to the Librarian, E. Dahlgren, in Stockholm, who will at once have it copied. In greatest haste; the anchor is already weighed. With distinguished respect and friendship,

"A. E. Nordenskiöld."

In sending this communication, Mr. Major writes :—

"I myself so warmly sympathise with and share Baron Nordenskiöld's gladness in lighting on this remarkable map, that I venture to offer a few explanatory words to enable the reader to appreciate it also. In 1390 a Venetian nobleman named Niccolò Zeno went, at his own expense, on a voyage rather of curiosity than discovery into the Northern Seas, his object being to visit England and Flanders. He was wrecked in a storm on the Færoe Islands, and was rescued from the wreckers by Henry Sinclair, Earl of Orkney and Caithness, into whose service he entered as pilot of his fleet. After remaining with this chieftain some time, he wrote home to his brother Antonio, inviting him to join him, which he did. Niccolò survived his brother's arrival four years, and Antonio remained in the service of Earl Sinclair ten years more, when he returned to Venice, and there died. It is from Niccolò's letter to Antonio, and later letters from Antonio to a third brother, Carlo, that the narrative of the movements of the two brothers is derived, a very important item in which is a visit by Niccolò to Greenland. The whole story had been written out by Antonio, but a descendant of his, named Niccolò Zeno, born in 1515, when a boy and ignorant of the value of these papers, tore them up; but some of the letters surviving, he was able subsequently to compile the narrative, and publish it in 1558. He found also in the palace a map, rotten with age, illustrative of the voyages. Of this he made a copy, unluckily supplying from his own reading of the narrative what he thought was requisite for its illustration. How disastrous was the effect of his well-intentioned, but necessarily blind efforts in this direction, may be judged from the fact that, through misreading the name of Eslanda or Estlanda (Shetland) for Iceland, he added to the latter the names belonging to the former. These are the names which Baron Nordenskiöld very significantly emphasises as being *absent* from the Iceland of his newly-found map. This is a point of importance in respect of a map which *does* bear those other names which he quotes as on the East Coast of Greenland, for they are absolutely identical with those laid down on that coast in the Zeno map. In this fact lies the quintessence of the value of this interesting find, for there is no other known source for the remarkable information

about Greenland that is presented at so early a period by the Zeno map. Of course everything depends on the date of Baron Nordenskiöld's find. The only suggestion on that head is his casual reference to the map of the Venetian, Andrea Bianco, which is of the date of 1436. If it be later than 1558, its value is reduced to a minimum, as there would be nothing to show that its information was not derived from the published Zeno map. If earlier, it becomes a focus of great interest, for there can be little doubt that the original MS. map of the Zeni lay among the family antiquities in the palace in Venice from Antonio's death till published by the later Zeno, and the unavoidable inference would then be that both it and the Baron's recent find are derived from a yet earlier source. Now, if we reflect that the date of the Zeno map is a full century before Columbus crossed the Atlantic, and yet that it and its accompanying narrative bring us the latest known accounts of the still existing remains of the old Norse colonies in America, first founded A.D. 1001, and of their continued commercial intercourse with Greenland, we cannot much wonder at the Baron's gratification. But what would still more interest him at the present moment is the occurrence of the Zeno names on the East Coast of Greenland, for as the East Bygd of the Greenland colony, which he believes to have been on that coast, was then flourishing, these names, vague though they be, would naturally have a tendency to strengthen his conviction and his hopes. We must all wish him God-speed in his noble enterprise. He brings to bear on it the conclusions of a learned and zealous antiquary, the scientific deductions of an experienced physical geographer, and an amount of pluck and perseverance under special difficulties, which have won for him a position in the world's history second only to that of Christopher Columbus himself."

GEOGRAPHICAL NOTES.

Mr. Thomson's Expedition.—Since our last issue we have received letters through Colonel Miles, Acting Consul-General at Zanzibar, giving further details of Mr. Thomson's retreat from the point he had reached north-west of Kilimanjaro to Taveta on the south-east. On learning that the leader had come down to the coast for further supplies, Colonel Miles was enabled, through the courtesy of Captain Luxmoore, to despatch immediately to Mombasa the steam launch of the *London*, with all that Mr. Thomson required, and he had heard that the goods had reached him safely. Colonel Miles further informs us that our traveller had probably, at the date of his letter (June 10th), started again for the interior to Taveta, where he had left his men encamped, and adds that Thomson would not be easily daunted and that, as far as he could learn, he had acted skilfully and with much judgment in the difficult circumstances of his position.

Pending the arrival of Mr. Thomson's official report, the following letter he wrote to Colonel Miles will be interesting to our readers :—

MOMBASA, *June 5th*, 1883.

On my arrival at Taveta, March 31st,* I found that I had a work of unexpected magnitude before me, viz. to string anew the thirty loads of beads I had with me. This occupied me, together with sewing special war dresses for the Masai and cutting the iron wire into particular lengths, no less than twelve days. It had then also become evident to me that it was necessary to have a second interpreter, and, as luck would have it, I found Sadi, the guide of Von der Decken and New, living like a pauper at Taveta, and after several days of the most annoying negotiations I secured him. I have not since formed a very high opinion of his character, but there was no one else to be had, and to give him his due he certainly knows the Masai language well. When I arrived at Taveta I found myself on the very heels of Dr. Fischer, he being at Arusha wa Chini, two days to the south-west. If I had not then had the work of stringing the stock of beads to do I should actually have preceded him, but unfortunately for me he was ready to go on and I was not, and thus it happened that he got a start of over a fortnight on me. You are aware that in all our inquiries of the German Consul as to Fischer's route we were informed that it was viâ Kenia to M'baringo, which seemed to leave to me my original route undisturbed. It was on this information that I made my preparations, taking the goods required on that particular route. It was vexing, therefore, on my arrival at Taveta to hear that Fischer was not going to Kenia but through the Masai country to Ngurumani, and then north to M'baringo. My goods intended for the Masai and Wa-kavirondo would not do for U-kambani; I could not therefore alter my route, which would also have entailed a great detour. There was nothing for it but to take a route which would keep me from actually following in the footsteps of Fischer.

The news came that he was going viâ Arusha and Kisongo, so I determined to follow the route to the north of Kilimanjaro, though much against my will, as it was known to be an expensive and troublesome route, though the direct one.

I left Taveta on the 19th of April, and two days after fell into the clutches of the chief Mandara, by a clever ruse of his, and had to stay three days, which I utilised by an attempt to ascend above the forest line (about 10,000 feet) but failed, owing to the want of time, having to go and return on the same day. It cost me to get out of

* Mr. Thomson left Zanzibar on March 6th, and finally started for the interior from the missionary stations near Mombasa, on the 15th March. The distance between the coast and Taveta was performed in eleven marches, or at the rate of fourteen miles in a straight line per day.

Mandara's hands my own double-barrelled smooth-bore, a Government snider with sword-bayonet, a service revolver, one of my iron boxes, a suit of European clothes complete, a great quantity of cloth, and some gunpowder.

Our route for the following five days lay round the mountain, over numerous impetuous mountain torrents, three or four of which were crossed with difficulty. During all this time we never saw the upper part of Kilimanjaro, except in short occasional glimpses about sunrise and sunset. Once I had a view of the summit for about half an hour. There was no snow on the lower peak, and on the upper one only a slight cap which, however, extended some distance down the southern side. It was a majestic sight to see the snow-cap glancing like burnished silver in the morning sun, flanked by the black craggy outlines of Kimawenzi, while huge, fleecy-white cumulus clouds rolled and tumbled along the sides, till at last a veil of stratus mysteriously appeared and in a few seconds the whole scene vanished and gave place to a blank expanse of grey. Upon the whole, however, I have been disappointed with its appearance; it is too vast and too regular in shape, and the broad platform of Chaga from which it rises—a garden of Eden in the matter of fertility—helps to spoil the effect. The country all round the base, though capable of producing anything, is totally uninhabited, owing to the dread of the Masai, but swarms with large game: buffalo, rhinoceros, zebra, and elephants.

On the 29th of April we reached the frontier of the Masai at a place called Kibonoto, where there is a tribe of Wa-chaga. Two days after a deputation of Masai came from Kiraragwa, inviting us, or rather giving us leave to enter their country. This we did the following day, camping near two villages or kraals on the Ngare na Erobi. The first day everything seemed all right, though I viewed with apprehension the enormous hongo that had to be given. Three other such hongos, and I should be practically stripped; but that was a small matter compared with the news that, despite all my efforts, I had actually fallen on the route taken by Fischer; and not only that, but found to my dismay that he had had some fighting two days ahead, in which a chief and two women had been killed, events which had never before happened in the Masai country. Fischer, however, with his large caravan, joined to another of equal size, was too much for them, so they accepted "blood-money," which, however, was laid aside, and they vowed vengeance on the first weak caravan which should pass. The appearance of such a one, with a white man, too, as the leader, was the signal for the rising of the whole country in advance. The elders of the place where we halted were against fighting, and rather on our side; but the day after our arrival all the young men disappeared, to join their friends. Attempts at coming to an explanation failed; nothing would satisfy them but a bloody revenge. Spies watched our move-

ments, our food was running short, and no more was forthcoming. We put on a bold front, and hinted that we were going ahead in two days, and that if they would not let us pass peaceably, we would fight them.

This fortunately kept them waiting, in order to catch us in the open. It was clear, however, that to attempt to go ahead would end only in a miserable disaster, probably annihilation. We felt confident we could beat them off, but we were not strong enough to capture food, and starvation would have been the result.

On the evening of the 6th May a blood-brother of our guide Muhinna came secretly into camp and informed us that a combined attack would be made in the morning, and warned us to be prepared as they were coming in great numbers. We felt that it would never do to wait for such an event, as it would mean at least the death of several men, the loss of as many loads, and the making of the country more bitter against our passage by any other route, as the news would soon travel. After dark the men, who had been kept ignorant of what was going on, were told to prepare for a night march, and making up big fires, which would burn some time, to deceive any one who might be on the look-out, we stole quietly out of camp.

Fortunately the night was dark and a slight rain fell which drove any wandering Masai home; we contrived to pass between the villages unseen, and early in the morning arrived at Kibonoto. Now if I had had fifty more men I would immediately have struck straight for Arusha, but with the number I had and reduced in loads to attempt the other road was but to find myself at Ngurumani without a load of iron wire, almost the sole means of exchange, and so, however much against the grain, I saw clearly that there was nothing for it but immediately to return to Taveta.

So to Taveta I did return with all the honours of war, and two days after I was on my way to the coast, and here I am.

I shall be off again in three or four days. If possible I shall arrange to go in company with an Arab caravan; if I fail in that, then I will do my best and do or die.

Dr. Fischer's Expedition.—On the 4th of July, the Secretary of the Hamburg Geographical Society received from Herr Emil Prallert, the German Consul at Zanzibar, a letter giving the first authentic news of the Hamburg Expedition which is exploring the snowy mountain regions of East Africa, under the leadership of Dr. Fischer. The writer says: "I avail myself of the present opportunity to inform you that news has arrived here indirectly respecting Dr. Fischer, to the effect that he was in good health, and that his expedition appeared to be going on well. The caravan of the English traveller, Mr. Thomson, was thought to be not strong enough to make its way through the territory of the Masai. He had arrived at Ngare na Erobi (to the west of Kilimanjaro), but had returned thence on the 5th of May. At Ngare na Erobi, Mr. Thomson learnt

that Dr. Fischer was distant only a few days' journey from him, and that, at the head of 800 men, he had forced his way through the country, after several of the Masai, including one of their chiefs, had been killed. Dr. Fischer, who himself had only 350 people with him, had apparently, according to this news, united with other caravans, and probably has thus succeeded in surmounting the principal difficulty he had to encounter in his journey."

Rumour of the Death of King Mtesa of Uganda.—We have received the following note on this subject from Colonel J. A. Grant, once the guest of the renowned African potentate:—"I am afraid from what we have heard for some years past of the change that had come over Mtesa, that the report published in our daily papers of the 13th July, of the death of this very remarkable man, must be taken as true. A few years ago when Messrs. Wilson and Felkin resided in Uganda, the king suffered from a malady which they believed would terminate fatally unless an operation was performed; and I understood from Mr. Felkin that he would have submitted to it, if his chiefs had not feared the consequence and dissuaded him. I am surprised at this as Africans as a rule operate upon each other without fear; however, we have yet to learn what caused the death of King Mtesa. He was a minor when first visited in 1862 by the late Captain Speke and myself, and succeeded his father King Suna about 1857, so that his reign has lasted twenty-six years, and the probable age he died at is forty-six. If we calculate that the thirty-five kings of Uganda have reigned for twenty years each, we have a period of seven hundred years to go back on, which may in a measure account for the 'blue blood' and vanity which certainly ran in the veins of Mtesa. He upheld the traditions of his country in many respects. His ancestors were hunters and kept hunting dogs: Mtesa when first seen by us, always led a dog by a neatly made cord, but we are told by Mr. H. M. Stanley that this animal had disappeared when he visited Uganda after us. I believe that Mahommedan influence had operated in the expulsion of this animal, as the term 'dog' is one of abuse among Moslems. Mtesa also showed every respect and affection for his clever mother, visiting her at her residence every second day while we resided in Uganda, and oftener when necessary to consult her on state matters, as she was one of those who were responsible for the actions of government during the minority of the prince. An allusion may be made to the other princes of Uganda, whom we saw going about in chains, as Mtesa had done previous to his election to succeed King Suna; the brothers felt no disgrace whatever in being so chained, they conversed, and attended picnics, and boated, and played musical instruments with their brother the king while they were chained, with perfect freedom of action, and of speech. In fact they were a happy mirthful family, enjoying life to the fullest extent, even with the knowledge that at the coronation of their

brother they would all be placed on a funeral pile. Mtesa was very anxious to hear what other people thought of him, and obtained much of his intelligence from the visits his chiefs paid to the countries around his own kingdom. He gave his orders by bits of stick, not being able to read or write, and his faithful chiefs would travel thirty to forty miles daily on foot, carrying only their spears, shields, and a respectable bark-cloth, and accompanied by a dog and a drummer. The Waganda thus travelled thousands of miles for their beloved king. They delighted to serve him, but they were the terror of the agriculturists of the countries they passed through, because they rarely paid their way, except when taking tusks to Zanzibar or any great sultan. Three of his chiefs came to England with presents for our most gracious Majesty, and lived to tell their sovereign what they had seen in England, and to deliver to him the presents they had received from our Queen. By such means he has become known throughout the world, and his loss will be generally recognised. At his bidding, his whole people would at once have adopted the Christian religion, so great was his influence and their devotion to him. He was wily enough to remain upon good terms with a few surrounding kings, such as the late amiable Rumanika, king of Karagweh, who was his southern neighbour, but he always had an eye for business, expecting a good return in cloths, trinkets, guns, and ammunition for the food, slaves, and elephant tusks he exchanged with either visitors or traders; but though, with us, he was gentlemanly in these transactions, he did not hesitate to send his pages to steal a bag of shot or any other thing which we might have refused him. This may not be manly according to our ideas, but I can forgive it, for we were paid handsomely in the end by gifts of cattle and loads of butter and bananas, so I may say that Mtesa was very hospitable; he certainly was manly, for no young Briton was fonder of sport and rollicking amusement, and indeed of acquiring information on every subject. It may therefore be said that during his reign he has promoted the cause of humanity by his intelligence; he has raised his subjects above the ordinary scale of all the Africans I have met with, chiefly by making them observe while travelling. He fearlessly adopted first the Mahommedan and afterwards the Christian religion by listening to the Mollahs and Christian travellers who entered his country, his previous belief being in one Supreme Being and in charms. To Mtesa is greatly due the discovery of the sources of the Nile—for he it was who gave us the route from the Victoria Nyanza to Egypt—and the knowledge that we have of the people and the flora and fauna of Equatorial Africa. Speke and I were not the only travellers of the Geographical Society who received kindness from this king. Baker too, while in the service of Egypt, was all but defeated by the Wanyoro, and a force from Uganda arriving in the distance was the cause of the dispersion of the enemy. Baker has told me that consequent on this particular

act of friendliness he had given his honour that Egypt and Uganda would never cross swords. Mtesa forwarded letters from Baker by his swift-footed soldiers, who could not reach Livingstone to whom they were addressed, because he was dead, but they were placed in the hands of Captain Cameron after a journey of six hundred miles. Who can ever forget the way Stanley writes of the 'Kabaka, the Emperor of Uganda,' the picture 'of the stone figures at Thebes,' and in the museums of Egypt, the 'slender, the lustrous-eyed.' Not a word too much was said of him by Stanley and the late brave Linant de Bellefonds, who saw him in his vigour, but the travellers who followed them have not the same enthusiasm for his character—nearly all belonging to the Church Missionary Society. It is to be doubted whether future visitors will ever receive the same protection as the firm power of Mtesa gave to those who visited him. He has not allowed his country nor his people to degenerate in any respect; cultivation has progressed, commerce has increased, manufactures by the missionaries have commenced, and the people are being dressed in calicoes, American sheeting, and fancy Eastern materials, instead of the bark sheets of their wild fig trees. The population of Uganda proper may be estimated at a million if we multiply the fighting men by five, but if the inhabitants of Karagweh, Usui, Unyoro, and Usoga be included, then the population would reach three millions. The army and navy, according to the statement of Mr. H. M. Stanley, has been raised to 125,000 soldiers, armed with spears and shields, with several hundred fire-arms. His fleet, according to the same trusty authority, consisted of five hundred canoes which could float sixteen to twenty thousand men. The fighting force of Uganda has therefore been well maintained, drilled, and equipped, after a fashion superior to anything in Central Africa, during the short period Mtesa has been king. His form of government was carried on by daily durbars, where several hundred chiefs of districts assembled with their followers to hear the eloquence of the prime minister and members of the government; nothing unseemly appeared beyond the silent removal for execution of some obstructionist; there was apparent decorum, yet by a whisper, an expression of the king's eye, mouth, or finger, how many hundreds, ay thousands, have not suffered death, mutilation, or slavery! To a novice like myself while attending these durbars and not understanding one syllable of the language used at the court, sentences or signals of death passed unobserved. I mention this to express my opinion that though such took place Mtesa's disposition was not savage; he presided at the durbar of his ministry, he was the chosen of the principal chieftains in his land, and was bound to carry out the hereditary customs of his country. When Speke held up his hand to stay the spear of the king who sought to take the life of a woman, the king was not a savage, he listened to the appeal, and the woman's life was saved. This interference never

changed the feeling of the king to Speke, and at the moment of bidding adieu to Mtesa we could not but show emotion and gratitude for the hospitality and friendship shown us.—J. A. Grant."

Mr. O'Neill's Expedition from Mozambique to Lake Shirwa.—We have received the following letter from Mr. O'Neill, written when on the point of starting on the new journey of exploration he has undertaken to Lake Shirwa:—"June 11th, 1883. I write this from the village of Ngambo, just before making my final start from the coast. I have had much difficulty in procuring guides and carriers, but hope to get away to-morrow with a compact little party of thirty, my favourite number. This village is situated on the south bank of the river of the same name, and its position I have fixed during the past four days (long. by chronometer, watch having only just been rated) as, lat. 15° 3′ 24″ S., long. 40° 31′ 45″ E. The river at this point is between 80 and 100 yards broad and three and four feet deep, but in the rains it overflows its banks considerably, and judging from the points the natives tell me it reaches, I should say it has already fallen eight or ten feet. I think it right I should tell you that from information I have the past few months received, I am beginning to doubt if the Lujenda does take its source in Lake Kilwa or Shirwa. At all events there is a considerable difference of opinion amongst the native traders who travel in those districts. Many tell me that the Lujenda rises in a lake called Amaramba or Mnaremba. One who says that he passed from the Lake Kilwa to Amaramba last year, declares there is no connection between them, and the ground rises considerably between the two. He describes Lake Amaramba as a long lake much smaller than Kilwa, but as having two islands in it. May it not be that the lake seen by Mr. Johnson and supposed by him to be the Shirwa was this Lake Amaramba? I only give you these reports for what they are worth. You know best what foundation there is for Mr. Johnson's supposition, and can judge between them. I shall of course endeavour to settle the doubt in this journey."

Lupton Bey and the Bahr-el-Ghazal.—We have been favoured by Mr. T. P. Hearne with copies of letters he has lately received from his relative Lupton Bey, Governor of the Egyptian Province of Bahr-el-Ghazal. In November last he was at Anyower, a remote station on the road to Sultan Mofio's country, situated, as far as we can gather, some distance to the west of 26° E. long. The country has never yet been explored by Europeans, although visited by ivory traders; Lupton Bey describes it as very picturesque, well-watered, and richly-wooded; the route lying through forests so dense that the sun is unable to penetrate the thick interlacing foliage overhead. Elephants abound; their trumpeting and the noise made as they crash through the trees disturbing the stillness of the solitudes. Monkeys also are frequently

seen clambering along the woody creepers that wind round from tree to tree. The natives belong to the Bunder Kretch, Aga, and Gobo tribes, the last mentioned being cannibals and very low in the scale of culture, the women going entirely naked and the men wearing only a coarse waist-cloth of their own manufacture. It is satisfactory to learn that Lupton Bey, who is a competent surveyor, is drawing a map of this remote part of Central Africa. He was engaged at the time in recruiting a negro force to act against the Mahdi and his fanatical army of Arabs and Arabised Nubians who are ravaging the provinces immediately to the north of Lupton Bey's government. His communications appear not to be entirely shut off, as he was able in September to visit Khartum and bring away supplies for his stations. The steamers which occasionally run between Khartum and the Bahr-el-Ghazal have hitherto made for Meshra el Rek, near the junction of the Kyt with the Ghazal river, which has been for many years the terminus of navigation on the Ghazal, and therefore the outport of the whole region; but Lupton mentions that a steamer was being built at Khartum of draught light enough to navigate the Djur tributary of the Ghazal, and that he intends, when it is finished, transferring the outport to Wau, about 80 miles further to the south-west. He speaks in high terms of the fertility of the country; excellent timber, next to ivory, is the chief article exported to Khartum. The Nyam Nyams, short, thick-set, red men, make excellent soldiers, thoroughly reliable to act against the army of the false prophet. Lupton Bey carries out the anti-slavery policy with unflinching rigour. All ivory is now bought in a legitimate way with trade goods.

The Congo.—Mr. H. Johnston, the naturalist, who accompanied Lord Mayo on his journey to the Cunéné, and afterwards proceeded to the Congo, has returned to Europe bringing the news that Mr. Stanley on the 1st of May was preparing to start from Leopoldville, with a flotilla of three steamers and many native canoes, on a voyage up the river to the Stanley Falls, a distance of about one thousand miles. He also reports that Mr. Stanley had formed alliances with various chiefs who own the territory along the north bank of the Congo for a long distance beyond Stanley Pool, and had signed treaties with a view to checkmating M. de Brazza; but the news from the headquarters of the International Association at Brussels is to the effect that Mr. Stanley has stringent orders to maintain a friendly understanding with the French Expedition, and to show deference to the rights acquired by France on the Congo. The frequent deaths of Europeans on the International establishment on the river has necessitated a succession of new appointments. The last arrivals announced have been M. Theodore Westmar and M. Esten Sunvallson, two Swedish gentlemen, Lieutenant Waverings of the Belgian Army, and Messrs. Palmarts and Defrère, who all appear to have joined Mr. Stanley above the falls; others have

reinforced the stations lower down. Among them M. Roger, who has arrived with two whale-boats destined to keep open communications along the reaches of smooth water between the stations Isanghila and Manyanga. We hear also of the appointment of two well-known English geographers, Sir Frederic Goldsmid and Mr. E. Delmar Morgan. Mr. Johnston reports the death of two more Belgian officers. It appears that just before Lieutenant de Brazza's arrival with the French Expedition, the agents of the Belgian International Association had taken possession of an important position on the Loango coast, viz. the mouth of the Kuilu, which M. de Brazza had intended to secure, as the starting-point for his direct road viâ the Niari Valley, to the navigable waters of the Congo above the falls. Finding Kuilu occupied he proceeded some twenty miles further south to Loango and Punta Negra, where the French flag was hoisted. The distance from these points of the coast to Brazzaville on the Upper Congo, whither Dr. Ballay has been sent in advance, viâ the Ogowé, is in a straight line about 280 miles.

Annexations in the Gulf of Guinea.—A tract of the West African coast extending about 70 miles from the right bank of the Manna river (the frontier of Liberia) to Sherbro, has recently been added to the British possessions. This has been followed by the annexation by the French of the native state of Porto Nuovo, lying midway between Whydah and Lagos. The negotiations for the latter were conducted by Captain Bories of the French Navy, commanding the corvette *Dupetit-Thouars*, and brought to a conclusion on the 2nd of April.

Progress of the French on the Upper Niger. — Colonel Borguis Desbordes has been successful in his operations on the Upper Niger. In two months, March and April last, he constructed a fort at the important native trading settlement of Bammaku on the river, repulsing many attacks of the natives under their chief Samory. The electric telegraph, in May last, was mounted in the place, and a line of forts now connects St. Louis with the Niger.

Recent Journey in the Bamangwato Country.—At a time when we hear so much of the disturbed state of the interior of South Africa, the following extract from a letter written by our associate Mr. R. C. Williams, at Shoshong, may be interesting as showing how the native districts west of the Transvaal at least, can be traversed with safety, and apparent enjoyment, by an English gentleman accompanied by his wife and son seven years old: "Here we are after travelling along the Limpopo, and across the Marico and Notuani rivers. After leaving the Limpopo, we had about 75 miles of thirst to travel through, without water. We were fortunate in meeting Mr. John Bennion on the river, and he came out with us and showed us the way. He is a trader and has a house here. The country belongs to Khame, chief of the Bamangwatos. The town (native) has about 8000 inhabitants, the tribe numbering about 20,000. Khame is away at war, and Khamane, his

brother, is now regent. Khamane is giving me boys to go on to the Matabele country (the people with whom they are at war), and on the borders of that country, at Tati, I shall have to leave Mrs. Williams, and ride 120 miles to Gubuluwayo (Lo Bengula's) to get other boys and guides. Thence, if well, I shall return to the Tati and start on with Mrs. Williams and the little boy to the Victoria Falls on the Zambesi. As all depends on Lo Bengula, who is a ticklish customer, I do not count on it yet. Travelling from the Tati to the Victoria Falls you reach Panda ma Tenka, there you leave your wagon and walk sixty miles to the Falls. For a little calico, I shall be able to get Mrs. Williams carried in a litter."

Nordenskiöld's Greenland Expedition.—Mr. Oscar Dickson of Gothenburg has received a letter from Professor Nordenskiöld, dated Reikiavik, June 8th. The communication concludes as follows :—"Thanks to the kindness shown to us in Denmark, our supply of coals, a material indispensable to the success of the expedition, was assured in Thurso, Reikiavik, Ivigtuk, and one of the colonies in Northern Greenland. There have come with us as passengers from Gothenburg Count Strömfelt and Messrs. Flink, mineralogist, and Arpi, philologist, who contemplate travelling for the purpose of study in Iceland during the summer. On the evening of the 23rd of May we left Gothenburg in our steamer the *Sophia*. About noon on the 31st we steamed through the straits between the Great and Little Dimmon in the Faroe Isles. On the evening of the following day we came in sight of Iceland; but as the sky was so much overclouded as to prevent any observations of the sun being taken and there are no sea-marks on the east coast of Iceland, we were unable to see the narrow entrance to the small bay for which we were steering. We only succeeded in finding it after we had got nearer the land and steamed along the coast for a couple of hours. At 11 o'clock in the morning we reached Randifjord (Red Gulf) and an hour and a half later we cast anchor in Eskefjord, a bay adjacent to Randifjord. Here Count Strömfelt and M. Flink were landed in order to pursue their work. On the 3rd of June all the scientific men of the company made an excursion with the *Sophia* to the Helgurstadz lime quarry, situated about 10 kilometres (or six miles) from Eskefjord. It is one of the most remarkable, and in a physical point of view, most important spots for minerals in the world, and we took various photographs of it. On the 5th of June we sailed for Reikiavik. At first the weather was splendid, but later a thick mist came on and as some fishermen who met us would not venture to pilot us we had to make the attempt by ourselves. We succeeded pretty well, although rather slowly, and at one o'clock in the night we cast anchor before the chief town of the island. We were fortunate in not being detained by the mist, for on the 7th of June there was another violent storm, which prevented an excursion planned by Dr. Nathorst to Hredravand, an important locality for petrified plants. I have taken in thirty tons of

coal, had the engine inspected, and landed Dr. Arpi. On the 10th of July I shall proceed on my voyage if the weather is favourable. All with whom we have come in contact here (in Reikiavik) have received us with the greatest distinction, and everybody, even the common people, appears to have been made aware by the Iceland newspapers of the object of our expedition. Would that we had had more time to make ourselves better acquainted with this remarkable land, a land which, as regards the history of civilisation in the north, may be termed classical. The crew is in the best of health. All well on board."

The Circumpolar Meteorological Stations.—Preparations are now being made for relieving and bringing home the observing parties who spent last winter and spring at the various circumpolar stations; it not being intended to continue the observations after the 1st of September. The *Pola* is already on her way to Jan Mayen to embark the Austro-Hungarian party, and the Swedish gunboat *Urd* is about to start for Spitzbergen on a similar errand. It is reported, as a hopeful circumstance for the deliverance of the Dutch expedition who have wintered in the Kara Sea, that the ice is in a favourable condition.

Dr. Edwin Heath's Map of the River Beni.—Dr. Heath has supplied us with the following information regarding the observations on which he has fixed the positions in his map of the Beni river published in the June number of the 'Proceedings'; the latitude, as may have been observed, of Reyes, and of other places dependent on it, differs very greatly, and the longitude to a less extent, from all previous maps. He says that during his stay at Reyes he took many observations for the latitude of the place, and all gave 14° 16′ 34·5″ S. The longitude of Reyes was calculated from a mean of 22 lunars, which exceeded the timed distance, taking the position of Santa Ana on the Yacuma, from Gibbon and Keller. He had corrected three watches to sure time when at Santa Ana on starting thence for Reyes, and had noted the difference of time on arriving at the latter place. Returning to Santa Ana by the river Yacuma, he had again timed the distance, and also a third time from Santa Ana to Reyes, when he returned from his exploration down the Beni. He is convinced that the positions of places on his map will not be found to err in latitude the fraction of a second, and in longitude 10 minutes.

The Crevaux Expedition.—The Paris Geographical Society has received from M. Thouar, a Frenchman residing in Peru, a communication stating that some of the members of the Crevaux Expedition are still alive. Writing from Tacna on the 16th of May, M. Thouar says that he was then on the point of starting for Bolivia in order to visit the native Indian tribes, by one or other of whom the traveller and a number of his companions were murdered. M. Thouar's first object will be to find the Indian Calinis, who acted as guide to the expedition, and who between the 20th and 25th of April conducted the French travellers from Irua to

Teyo. It appears that Calinis was aware of the intention of the tribe of the Tobas to attack the expedition, and he is reported to have given Dr. Crevaux warning to that effect. M. Thouar purposes further to seek out the Indian Yahamahua, who was the first to bring intelligence of the butchery to Tarija; and likewise to inquire into the fate of the members of the expedition who fell as captives into the hands of the Tobas. It appears almost certain that the companions of Dr. Crevaux were not all destroyed. The French steersman Haurat, the Argentine sailor Blanco, and a Bolivian named Rodriguez, as well as the cook and the Indian Lenguaras, all escaped with their lives. The young Señor Ceballos, who also accompanied Dr. Crevaux, is reported to have been kept prisoner by the Tobas from April 27th to August 1st last year, and to be now in captivity at Caiza. With his letter, M. Thouar inclosed extracts from two of the local newspapers, one of which gives the following particulars: "When those who were in the pirogues saw the Indians proceeding to deeds of violence, they leaped into the water, but were pursued by the savages, who captured young Francisco Ceballos. His father was also caught in the middle of the river and at once put to death. Only the French sailor Haurat, and Blanco, the Argentine, escaped, which they did by rapidly swimming to the further bank of the Pilcomayo and concealing themselves in the forest. Up to the present time it is not known what has become of them. The interpreter Iramaje was captured and carried off. The bodies of the slain were in some cases thrown into the river, in others left on the spot where they were slaughtered. Only the body of Dr. Crevaux was taken away by the Tobas in solemn procession to a neighbouring camp, where the savages passed the night and the following day in singing and dancing. Afterwards they buried the corpse on a conspicuous eminence, at a spot called Curo-Varuchai, situated to the east of Pilcomayo." These particulars were obtained by the local papers from the Indian interpreter Chirugnano, who, after a captivity of some duration, succeeded at length in escaping from the hands of the Tobas.

The late Captain H. J. Harman, R.E.—A biographical notice of this accomplished officer, who distinguished himself in the Trans-Himalayan work of the Great Trigonometrical Survey of India, was given by General Walker, the Surveyor-General, in the Royal Engineers' 'Journal' of May 1st. Captain Harman became known to geographers in Europe through the valuable contribution he made towards the solution of the Sanpo-Brahmaputra problem, by despatching a Tibetan specially trained by himself to continue the exploration of the Sanpo below Chetang, the furthest point known at that time, viz. in 1877. A short account of this journey, illustrated by a map, was published by General Walker in the 'Proceedings' of the Asiatic Society of Bengal for August 1879. The exploration extended our knowledge of the Sanpo down to within 90 miles of the known part of the Dihong, the principal affluent of the Brahmaputra, with which the Sanpo was considered by Harman to be continuous, and it further revealed an

unexpected northern bend of the river below Chetang, and brought to our knowledge the reasons why this portion of the great river has remained unknown. The country is rugged and mountainous and peopled by wild tribes who murder all strangers. No living man, as General Walker states, is known to have travelled either down the as yet uncertain portion of the Sanpo, or up the as yet uncertain portion of the Dihong. Captain Harman died on the 14th of April at Florence, from tubercular pneumonia, contracted by exposure and hardship during his service on the survey. He had, two years before, in his enthusiasm and love of his work, spent a night at the foot of the Donkia Pass, on the border between Northern Sikkim and Tibet, and lost half his toes through frost-bite on the occasion, besides, as it is found, laying the seeds of the malady which compelled him, still a young man, to throw up his career and seek recovery, in vain as it happened, in Europe. Captain Harman was not a Fellow of our Society.

Mr. Cuthbert E. Peek.—Our associate, Mr. Peek, who, as we have already recorded, sailed for Queensland as one of the observers in the Transit of Venus Expedition under the direction of Captain Morris, R.E., has, since the transit, visited New Zealand, and studied the geysirs and hot springs between Tongariro and White Island, with a view to comparing them with the similar phenomena which he had examined in Iceland in 1881. Mr. Peek informs us that he has observed a considerable difference between them, both as regards their movements and appearance; this is especially the case with the so-called mud-springs, for while the matter ejected at Hlitharnarmar, in the North of Iceland, is nearly black, that thrown up by the New Zealand springs, of the same class, is of a creamy white colour. For further particulars as to the differences of temperatures and analyses, we must await Mr. Peek's return to England.—Mr. Peek has also sent us the longitudes, as determined by electric telegraph, of the following important stations:—

		h.	m.	sec.
Singapore	Longitude	6	55	24·22 E.
Port Darwin	„	8	43	21·73 E.
Melbourne	„	9	39	53·41 E.
Adelaide	„	9	14	19·61 E.

The longitude of the Observatory of Melbourne, on which those of the other positions depend, had previously been fixed by a series of independent astronomical observations, and as the present results show, with considerable accuracy, but it was resolved to take advantage of the Transit of Venus Expedition in Queensland to determine the longitudes of several stations with greater accuracy than had hitherto been possible. A member of that party, Lieutenant L. Darwin, R.E., undertook the observations at Singapore, the position of which had already been accurately determined by electric telegraph, an assistant from Melbourne was sent to Port Darwin, which is in telegraphic communication with

Singapore, and the whole was under the direction of Mr. Ellery, the Superintendent of the Melbourne Observatory. The longitudes of the foregoing stations were corrected by the following quantities:—Melbourne Observatory by 1·4 sec. of time or 21″ of arc, Adelaide Observatory by 1·7 sec. of time or 25·5″ of arc. The position of the telegraph station at Port Darwin as given on the Admiralty Chart is 8 h. 43 m. 23 sec. and this agrees within 1·27 sec. of time, or 19″ of arc, with the present results. The corrections made in the positions will therefore amount, in the case of the Adelaide Observatory to 705 yards, and in that of the Melbourne Observatory to 560 yards.—The expense of carrying out these observations was shared by the various Australian Colonies, the work being justly considered of public importance, for now the longitudes of all places in telegraphic communication with any of the foregoing stations, can be determined with accuracy, thus greatly facilitating the production of reliable maps of the several colonies.

Italian Deep-Sea Explorations in the Mediterranean. — Professor Giglioli embarked at Naples on the 25th of July in the Italian man-of-war *Washington*, to resume his deep-sea and thalassographic investigations in the Mediterranean. The *Washington* is under the command of Captain G. B. Magnaghi, Hydrographer to the Italian Navy. It is intended to make a complete Physical and Biological survey of the Mediterranean and its connected seas, the present being the third year of the explorations. The undertaking is under the patronage of the venerable Accademia dei Lincei, and the expenses are defrayed by the Government.

Obituary.

William Spottiswoode,* President of the Royal Society, was born in 1825. He was formerly connected for many years, and very intimately, with the Royal Institution as its Secretary, and with the British Association as its Treasurer, and otherwise more engaged in scientific administration than any of his contemporaries; he served on the Council of the Royal Geographical Society, and for two years, 1862–64, also fulfilled the duties of Honorary Secretary. He was presumptive heir to a large property, and was educated at Eton, Harrow, and Oxford, but while still residing at the latter place he was suddenly summoned to London to manage under many difficulties the business of his father as Queen's printer. He responded bravely to the appeal, and it is one of the most characteristic points of Mr. Spottiswoode's honourable career that during the whole of the laborious and anxious years of his early manhood he contrived to set aside a considerable portion of each day for scientific and literary pursuits. He thus acquired the art of swift and thorough achievement, by means of which every scrap of his time was utilised. Moreover, having an intellectual insight of the highest order and a singularly sound judgment, all his work stood and the results accumulated. His administrative success became

* By Francis Galton, F.R.S.

so great that it seemed to beget in him an insatiable desire for such labour; his mental grasp was immense, and consequently few have passed lives comparable to his in their usefulness and many-sidedness. He controlled a most important printing establishment; he was one of the foremost of English mathematicians and experimental investigators; he was the leader of scientific society, and through his wide relations with the most gifted persons of various classes his residences in town and in the country became important social centres. He was also actively interested in the well-being of the hundreds of his *employés*, by whom he was warmly beloved and generally looked upon as a personal friend. In short, he lived the fullest of lives and, it is to be feared, too full a one, for he was prematurely overworn, and when at last he was persuaded to take a brief respite from labours by an Italian tour, he was quickly seized upon by the germs of typhoid. He sickened soon after his return home, and died on the 27th of June last, at the comparatively early age of fifty-eight, in the plenitude of his intellectual powers and with a large amount of investigation into the theory of electricity, in progress. He was buried in Westminster Abbey in the presence of a vast concourse of mourners, including a large proportion of those who are most eminent in science, literature, and art, or for their public services.

In this brief notice I shall dwell almost entirely on the geographical tastes that formed one notable side of Mr. Spottiswoode's varied character, and on the geographical and ethnological pursuits that upwards of twenty years ago filled, perhaps, the largest portion of his leisure time. He had, in those days, a passion for Asiatic questions, topographical and philosophical; it had been fostered by many circumstances, one of which was a considerable effort that he had previously made to discover the principles, purposely disguised as they are in fantastic arithmetical "rules," through which Indian astronomers made their calculations, and whether those principles were indigenous or derived from Greek sources. About that time we shared a common interest in many geographical undertakings. We worked together as the two Honorary Secretaries of the Royal Geographical Society, during what we both considered to be a very critical period of its existence, and to which I will not further allude. We also worked together at the Ethnological Society. Again at that time, the Peninsula of Sinai was very imperfectly known and was beginning to attract attention; we had both recently returned from travel, he from his 'Tarantasse Journey through Eastern Russia in 1856,' and I from South Africa, and he started the idea, to which I cordially agreed, that we should together make a survey of Sinai, triangulating the main peaks and giving especial attention to the wilderness of Et Tih. This scheme fell through, owing to a serious illness of my own, but our preparations brought us into daily companionship, reading and noting authorities, studying Arabic and practising surveying, and in the whole of this work his zeal, judgment and thoroughness struck me as truly remarkable. At this time he devised a very useful artificial horizon consisting of a piece of glass floating in a small vessel of mercury, and had it made by one of his own workmen. The principle was afterwards adopted by Captain George, and the instrument is now largely in use under the name of George's Artificial Horizon. He also devised and published in the Journal of the Astronomical Society, a method and accompanying tables for calculating longitude by the meridian altitude of the moon, at times when her declination is rapidly changing. We tried the plan together, and it still appears to me to deserve more attention than it has received, owing to the much greater ease and accuracy with which observations may be made by the sextant when it is held in the easy position suitable for meridian altitudes, than in the constrained or unsupported position usually required for taking lunar distances. A memoir by Mr. Spottiswoode, published in the Royal Geographical Society's Journal, on 'Typical Mountain

Ranges,' is characteristic of his tastes at that time. It is an application of the mathematical laws of probability, with which he was then much interested, to the question whether or no a particular series of mountain ranges running at various known degrees of inclination to one another, could or could not be reasonably ascribed to the same disturbing cause. There are, I fear, few besides myself, now living, who can adequately testify to his keen geographical interests in those days. I can think of three persons at least, who, if they had been alive, would have done so most emphatically. They are Lord Strangford, the profound Oriental geographer and ethnologist, Atkinson, the Siberian traveller, and Dr. Barth, the learned African explorer. Though Mr. Spottiswoode was eminently scientific in his tastes, I cannot help thinking that the charm which geography exercised over him lay more in his love of varied landscape, history, and human character, than in the technically physical part of the science. I do so for many reasons, one of which may be mentioned here since future biographers are not likely to be aware of it, namely the gift he possessed of pictorial imagination. I know from his replies to my questions how vivid it was; it enabled him to do amusing feats of rapid picture-memory of much the same class as those recorded by Houdin the conjuror, about himself and his son.

Concerning the serious mathematical and physical pursuits of his life, upon which his scientific reputation rests, and which together with his personal ascendancy and other noble qualities, raised him, in 1879, to the highest position that a scientific man can hold, that of the official representative of science in England, I shall not speak further except to contribute one biographical jotting. I quote it from a note written to me in answer to a question whether he considered his scientific tastes and success to be due in any respect to personal influences. His reply was "my interest in mathematics began at Oxford, and was due mainly to the energy and encouragement of my tutor Dr. Temple (Bishop of Exeter)." He added on a subsequent occasion, and I pencilled it down from his mouth at the time, "but Professor Donkin first inspired me with a sense of the magnificence of mathematics."

It is with the less regret that I stop here, because I feel that even in a much longer memoir it would be impossible for any one to give within reasonable bounds a just idea of the multifarious and rich results of Mr. Spottiswoode's vast but unobtrusive activity. He loved to do a piece of good work, bringing order out of disorder, efficiency out of entanglement, thoroughly and finally, and then to dismiss it from his mind, and begin afresh on another. He was one of the best and fairest of chairmen. Of the many able scientific men with whom I have had the delight at various times of working, on committees and elsewhere, I have seen none who were his superiors, few, if any, who were his equals, in the art of what I may call constructive, as distinguished from destructive criticism, for he had peculiar skill in detecting and eliminating the faulty elements in any proposed scheme, and in reinforcing the good ones. Thus, although he did not speak much in council, he was regarded as one of the most valued members of every committee on which he was ever called to serve.

Should the life of Mr. Spottiswoode be hereafter written by a competent biographer, his name will assuredly take its place in the national memory as one of those upon whose ability, moral character, and resolute work, the credit of the English nation is mainly founded.

General Sir Edward Sabine, R.A., K.C.B.*—By the recent death of Sir Edward Sabine, at the advanced age of nearly ninety-five years, the Royal Geographical Society has lost an old and distinguished member. Widely known for his active and well-directed researches in the somewhat obscure science of terrestrial magnetism—researches which extended over a period of more than fifty

* By Captain Sir F. J. Evans, K.C.B., F.R.S.

years—he was in the earlier part of the century distinguished as a traveller of exceptional scientific attainments. So early as in the years 1818–20 we find him prominently employed in Arctic enterprise, accompanying, as the official astronomer, the ships forming the first and second expeditions under Ross and Parry, fitted out by Government, to search for the North-west Passage, as assumed to lead from the Atlantic to the Pacific Ocean. In 1822 we find him again officially embarked in a ship of war, making experiments at selected stations near the Equator, on the Atlantic coasts of Africa and America, for determining the variation in the length of the seconds pendulum for the determination of the figure of the earth. In the subsequent year these observations were extended by him to Norway, Greenland, and Spitzbergen.

In these several voyages, undertaken, it may be observed, at a time when science was scarcely aroused from the enforced repose consequent on the French revolutionary wars, the practical and sagacious mind of Sabine was engaged in the elucidation by experiment of various questions in physical science, directly connected either with the art of navigation, or as bearing on questions of interest connected with the sea. We accordingly find, in the scientific publications of the day, papers "On the irregularities observed in the direction of the Compass-needles of the Arctic discovery vessels *Isabella* and *Alexander*, caused by the attraction of the iron contained in the ships"; observations "On the Dip and Variation of the magnetic needle and on the Intensity of the magnetic force, made during a voyage in search of a North-west Passage"; "On the Force of Magnetism compared with the Dip"; "On the Temperature at considerable Depths of the Sea"; "On the method of investigating the direction and force of the Currents of the Ocean"; "On the presence of the waters of the Gulf Stream on the coasts of Europe"; "On the important distribution as affecting navigation between the Guinea and Equatorial Currents"; "On the depression of the Horizon of the Sea over the Gulf Stream"; "On the Barometric measurement of Mountains."

These several researches, combined with a sound knowledge of practical astronomy and a skilled use of the most refined philosophical instruments, placed Sabine at a comparatively early age as one of our leading working men of science; we find him accordingly (in 1821) as a Captain of Artillery at the age of thirty-three receiving the Copley Medal of the Royal Society, he having been elected a Fellow of that body three years previously.

In the long interval between the termination of Sabine's experiences afloat (1823) and his resignation of the Presidency of the Royal Society in 1871, after ten years' occupation of that eminent position, his chief labours were directed to the advancement of our knowledge of terrestrial magnetism. It is difficult, within the limits of a necessarily brief memoir, to do justice to what he accomplished in this still obscure but, to use his own words, "most important branch of the physical history of the planet we inhabit;" we propose, therefore, to alone sketch the salient features of these extended researches. They may be classed under two heads: (1) Terrestrial magnetism proper, or the distribution over the surface of the globe of the elements known as the variation and dip of the freely suspended magnetic needle and the magnetic force acting thereon. (2) The forces, chiefly cosmical, acting at every moment of time upon the freely suspended needle at any one place; the steady movements of the needle, obeying certain periodical laws, but at times subject to much disturbance from spasmodic shocks simultaneous in their action over the globe. With (1) the secure navigation of ships, and especially those of iron, is intimately connected; from (2) the bond of magnetic sympathy between our earth, the sun, and the moon is assured, though the design is as yet veiled.

Sabine's remarkable series of "Contributions" to the 'Philosophical Transactions' numbered from I. to XV., commenced in 1840, and concluded in 1876,

gives full details of the distribution of the magnetic elements over the globe, for a given epoch (1842–3), derived from every contemporary source. For the future development of a theory of terrestrial magnetism and of the part it plays in nature, a subject of which we are yet in ignorance, these "Contributions" and his several reports to the British Association for the Advancement of Science, which included magnetic surveys of the British Islands, form a solid foundation for posterity to build upon.

The introductory discussions to the observations (published by the Government in a series of volumes) made for some years at the Colonial Magnetic Observatories of Toronto, St. Helena, Cape of Good Hope, and Hobarton, founded and organised also at the instance of Sabine,—partly in connection with the memorable Antarctic Expedition under James Ross 1839–43,—supplemented by special papers in the 'Philosophical Transactions,' deal with the perturbations of the needle as due to cosmical causes, and leave little to add to in this branch of physics, at least for our own era, from the clear and exhaustive manner in which the numerous observations have been discussed.

As one of the pioneers in Arctic discovery undertaken during this century, Sabine fully appreciated the energy and other admirable qualities fostered and displayed in Arctic (and Antarctic) expeditions: he maintained a lively interest in the many subsequent voyages, and was a trusted adviser of the Admiralty thereon. The preface to the Russian Von Wrangell's narrative of an expedition to Siberia and the Polar Sea, in the years 1820–23, as translated by Mrs. Sabine (1840) from the German, and edited by Sabine (an enlarged 2nd edition appeared in 1844) is an interesting record of his views in relation to the existence of open navigable water in the Arctic Seas, and to the striking resemblance in the configuration of the northern coasts of the continents of Asia and America for several hundred miles on either side of Behring Straits, as features bearing on future research;—views largely confirmed by later experiences.

The translation of Alexander Von Humboldt's 'Cosmos' by Mrs. Sabine and edited by her husband (1846–58) undertaken in compliance with the wish of the author, should not here be omitted. The illustrious German traveller and geographer held the gifted couple in great esteem, and doubtless the charm and permanent value of the work in its English garb is enhanced from the thorough grasp, by both translator and editor, of the great array of facts in nearly every branch of physical science, especially of Terrestrial magnetism, therein brought under review. In an editorial preface Sabine expresses his indebtedness to the earlier writings of Humboldt, "for awakening in his mind a taste for pursuits which formed a large portion of his interest and added greatly to his enjoyment in life."

Whilst 'Cosmos' was in the course of publication, Sabine became a member of the Geographical Society (1852) and served on the Council for some years. He was also for many years an active member of the British Association, was its General Secretary twenty-one years, and President, in 1853, at Belfast. Sabine was born in Dublin, October 14th, 1788, and received his first commission in the Artillery in December 1803, having been educated in the Military Colleges of Marlow and Woolwich; his early active service appears to have been limited to the American Campaigns of 1813–14; attaining the rank of Lieut.-Colonel in 1841, he retired with the rank of General in 1874. His scientific honours at the hands of his countrymen and from foreign institutions were many and well deserved. In recognition of his public services in the cause of science, he was created K.C.B. in 1869. The later years of Sabine were passed in close retirement; his accomplished wife, who had aided him in the work of half a century, died in 1879, and the veteran of science himself passed away on June 26th, 1883. They rest near each other in the family vault at Tewin, in Hertfordshire.

REPORT OF THE EVENING MEETINGS, SESSION 1882–83.

Fourteenth Meeting, 25th June, 1883.—Major-General C. P. Rigby, in the Chair.

Presentation.—*G. S. Morgan, Esq.*

Elections.—*Wm. Thomas Ansell, Esq.; Aug. Baker, Esq. (H. M. Consul, Khartûm); Edward Shuckburgh Rouse, Esq.; Rev. Hugh R. Collum; Carl Haag, Esq.; J. Scott Keltie, Esq.; Howard John Kennard, Esq.; W. J. H. L. Marchant, Esq.; Edward Arthur Maund, Esq.; Septimus Potter, Esq.; Charles D. Radcliffe, Esq.; Hon. Gordon Sandeman; F. A. A. Simons, Esq.; Jean Van der Elst, Esq.*

Sir John Kirk, K.C.M.G., read the following paper, which the author had communicated through him to the Society :—

"A Visit to the Masai People living beyond the Borders of the Nguru Country." By J. T. Last (of Mamboia, East Central Africa).

The paper and the discussion which followed the reading will appear in a subsequent number of the 'Proceedings.'

At the conclusion of the meeting, which was the last of the Session, the Chairman announced that the next meeting of the Society would be on the second Monday in November next.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—June 15th, 1883: M. Ant. D'Abbadie, of the Institute, in the Chair.—The Minister of War transmitted two maps of the frontier of the Alps, scale 1 : 80,000 and 1 : 320,000 respectively, recently published by the geographical service of the army. At the same time the chief of this service, Colonel Perrier, of the Institute, gave hope of the erection, at no distant date, of a meteorological observatory on the summit of Aigoual in the Cevennes, a peak 5142 feet (1567 mètres) in height.—Two maps of Tongking were presented to the Society by their respective publishers; one by M. Mallard-Cressin, scale 1 : 850,000 (J. Gaultier), and the other by M. Henri Mager, scale 1 : 6,500,000, with a plan of the city of Hanoi (Ch. Bayle).—M. Rougement, an engineer at Santiago, sent a map of the South of Chili Railway between Santiago and Angol; the map has been prepared from his own surveys and from official documents.—A portrait of Sebastian Cabot was offered to the Society by M. Codine; it is a photograph taken from an engraving of a picture painted by Holbein between the years 1547 and 1554, when the artist was already old. The original, it appears, disappeared from Whitehall Palace at the time of the sale, made under Cromwell's orders, of the articles which belonged to Charles I.—The Minister of Commerce forwarded a circular, announcing the formation in his department of a service for obtaining commercial information. The Bureau, which has just been formed, will be subject to the Cabinet of the Minister, and will centralise all information relating to commerce, industry, and navigation. It will moreover be engaged in the translation of articles in foreign technical works, which treat of these matters. The information thus obtained will be communicated to the public.—Three short papers on the environs of Obock (East Africa) were communicated in writing by the Minister of Public Instruction. The author of two of them is M. Aug. Aubry, civil engineer. They have reference to the geology of Obock, and this is the first time that this subject has been discussed. The third paper, which is by Dr. Hamon, concerns the

climatology, hygiene, &c., as well as the fauna and flora of Obock. At the same time the Society received a letter from M. Paul Soleillet, dated February 3rd, from Ankober. In this letter he expresses his satisfaction with the reception he has met with from the King of Shoa, Menelik II., who really reigns over the populations of Obock. M. Soleillet stayed a fortnight in this latter district, as well as at Djema and Goma, where no European had up till then penetrated. As the results of his journey to Shoa, Kaffa, &c., which lasted in all three months, he has made numerous collections, obtained a large amount of geographical and ethnographical information, and brought back specimens of coffee, the plant which forms the underwood of all the forests from the river Gueba. A letter which was addressed to M. Soleillet, and the contents of which he has reproduced in his own communication, charges the Pacha of Zeila, Aboubakar, with desiring to make attempts against the life of M. Soleillet. *A propos* of this it is stated that the said Pacha is responsible for the murder of MM. François Lucereau and Pierre Arnoux. It is probable that the diploma of an honorary member of the Society will be, at the request of M. Soleillet, granted to King Menelik in consideration of the protection afforded by him to travellers and merchants. A further matter concerning Obock is contained in a document addressed to the Society and announcing the formation of a commercial company, under the following appellation—"Les Factoreries Françaises du Golfe Persique et de l'Afrique Orientale." The object of the company is the development of French commerce (export and import) with the east. It has, says the prospectus, already established direct relations with the districts of Persia on the banks of the Tigris and Euphrates, "where," to use its own words, "England engages in annually, according to official statistics, 200 million transactions in English, French, and other produce." Contracts have, it appears, already been made with King Menelik, who is the owner of all the riches of his own kingdom and of the neighbouring countries under his sway. Under these contracts the company engages to convey to Obock, at its own expense and risk and in its caravans, all the goods which the king orders and to convey them at fixed prices; the money is also to be taken by its caravans and at its own expense to Obock, the place of mutual exchange. The company has sent to the king, at his request, a doctor, and also a mining engineer to explore the mines of coal, copper, gold, silver, and precious stones, which exist at Shoa. A central factory has been established by the company in this same place (Obock), at the exit of the Red Sea and a few hours' journey from the English port Aden.—The Syndical Chamber of Export Commerce, of which M. A. Person is the President, sent a report, which was unanimously adopted by the Chamber, with reference to the founding of *bourses de voyage* in favour of young Frenchmen who leave the schools of commerce with diplomas. The report goes on to state that France, considering her population, furnishes perhaps, in point of commerce, less articles to the foreigner than any other country, especially if we compare her to England, Germany, Switzerland, or Italy. It is with the object of putting an end to this state of things that the Chamber in question proposes to make an appeal to all the French Chambers of Commerce, to the Syndical Chambers of Paris, and to all who are interested in the development of French export commerce, in order to raise the necessary capital for founding these *bourses de voyage*. The young men thus maintained will correspond monthly with the Export Chamber, and a *résumé* of the correspondence will be issued every three months to the subscribers.—General Venukoff, who had just received from Russia a printed account of M. Préjevalsky's third journey in Central Asia, presented this volume to the meeting. He stated that the total length of the itineraries of the Russian traveller was 14,623 miles (23,530 kilometres), that he has made topographical surveys over 7535 miles (12,125 kilometres) of country, before entirely unexplored; that he has determined

the latitude of 48 points and the altitude of 212 others. He has collected 6000 plants, 3425 birds, 976 reptiles, 423 fishes, and 408 mammifers, besides obtaining a considerable number of anthropological and ethnographical facts and statistics. At the present moment the indefatigable traveller is again starting, and will proceed to Kiakta in order to continue his explorations in Central Asia. He will visit the north-west part of Tibet. He has an escort of twenty Cossacks, and is provided with victuals and all that is necessary for a two years' journey in the desert. M. Venukoff also stated that it is now possible to travel from the Black Sea to the Caspian in thirty hours, the railway between these two seas being open.—M. Romanet du Caillaud communicated a paper on the subject of the Suzerainty of China and the Protectorate of France over Annam. The paper, which could not be read at the meeting on account of its length, will be inserted in the quarterly *Bulletin*.—It is probable that we shall at last be able to arrive at some definite conclusion as to the existence, number, and nationality of the former members of the Crevaux mission, who are said to be still alive and detained as prisoners among the Tobas. M. Thouar, who is travelling in South America and who has just traversed Colombia especially, wrote from Santiago (Chili) on 3rd February that as soon as he arrived at La Paz he intended to proceed to the south and follow up the route taken by Crevaux to Tupiza. There he would gain information from the Indians who hold communications with the Tobas, then, having full particulars, he would determine the most practicable way to attain the object of his enterprise. He thought it would be best to proceed to the tribe of the Tobas alone and without any escort, except an Indian guide, in order not to arouse any suspicions. On his arrival he intended to negotiate with the chief for the ransom of the unfortunate prisoners.—M. Marguin, in a letter dated May 8th from Buenos Ayres, stated that he was going to take up the exploration of Crevaux on the Pilcomayo, but that he would go first of all by land, coasting along the river, and then descend it again upon rafts. He intended to devote a month or two to the exploration of the districts between the Pilcomayo, the Rio del Fuego, and the Paraguay.—In conclusion a communication was made by M. Brau de St. Pol Lias upon his journey to Atcha and Perak (Sumatra and Malacca). Details of the second part of this journey will be found in the volume which the author has just published, entitled 'Pérak et les Orangs Sakeys'; this latter race is the most primitive in existence, possessing neither huts nor clothes of any kind.

Geographical Society of Stockholm.—18th May, 1883: Dr. O. Montelius, President, in the Chair.—A letter was read from Herr Worsaae, of Copenhagen, inviting the co-operation of the Society at the International American Congress, which will meet in that city from the 21st to the 24th of August. Another communication was read from the Union Géographique du Nord de la France requesting the Society to send a delegate to the Geographical Congress to be held at Douai between August 26th and September 1st, and which is to be accompanied by a Geographical Exhibition open from August 15th to September 15th.—Dr. Stolpe then read a paper, translated from Japanese, on the rules and etiquette to be observed in Japanese "society."—The Secretary, Herr Dahlgren, next drew attention to a chart, just issued by the Commissioners of Roads and Waterworks of Sweden, showing all lakes and rivers in the southern part of the country, as well as bogs, which might be drained for cultivation. He stated that in this part of Sweden alone there were more than ten thousand acres of bog which would be, if drained, fit for cultivation. The Government had asked the Diet for a sum of ten million kronor to commence this work.—Dr. Montelius, the President, read a letter from a Miss Mestorf, in Kiel, a corresponding member of the Society, in which she referred to the use of tin in the bronze age. The President then addressed the meeting on the subject of the participation of the Swedes in the Viking expeditions

to *western* Europe. This question had been raised by a writer in the 'Journal of History' with reference to his (Dr. Montelius') work on Sweden in pagan times. He, Dr. Montelius, thought there was no doubt that the Swedes had participated in the Viking expeditions to the west, although those to the east were most numerous. It was no evidence against this that writers of the period in Western Europe only mentioned Norwegians and Danes. These names embraced all Scandinavians in the same manner as the Easterns at the present day call all Europeans Franks. Besides, two writers of the time, Einhard and Helmold, spoke distinctly of the "Svear," Swedes, as being included among the Normans. The strongest proof of the fact was, however, several Runic stones, which clearly stated that certain heroes had died in *western* marauding expeditions. The force of this view some writers had attempted to minimise by asserting that the Swedes, when marauding in the West, acted merely as the auxiliaries of the Norwegians and Danes, but he (the speaker) did not think that the term auxiliary could be applied in a time when every one was his own master. He certainly admitted that the Swedes participated in this capacity in Canute the Great's conquest of Britain, but this was long after the Viking expeditions, while it was of quite a different character. Besides, on many Runic stones such inscriptions had been found, as "He went to Britain," "He died in Britain," &c. As one of the most conclusive proofs of the Swedes' participation in the expeditions of the Vikings to the West, he considered, however, the circumstance that great quantities of Anglo-Saxon coins, and some Frankish had been found in Sweden, particularly on the Island of Gotland—in fact, they outnumbered all those found in Norway and Denmark together. He therefore considered that he was fully justified in having devoted a chapter in his history of the Swedish people to their Viking expeditions to the West of Europe.—The Society then adjourned for the summer recess, the next meeting being fixed for October 19th.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Den Norske Nordhavs-Expedition, 1876-1878.—[The Norwegian North Atlantic Expedition, 1876–1878.] Part X. Meteorologi, af H. Mohn. Christiania (Grøndahl): 1883. Imp. 4to., pp. 150, plates, woodcuts. (*Sampson Low & Co.*)

This further instalment of the great Report noticed in the March No. of our 'Proceedings' for the current year, pp. 179–182, is, like its predecessors, printed in parallel columns of Norwegian and English. It consists of a memoir describing the meteorological work of the Expedition, which was planned and organised by Prof. Mohn, who himself took an active part in each of the three cruises. He notices in detail the instruments employed and the mode of using them, with reduction of the observations (separately for each of the meteorological elements), and also tabulates the reduced values, finally giving the deduced results. The appendix contains an account of experiments undertaken to determine the evaporation of sea-water.

[Han-sur-Lesse.]—The Hades of Ardenne. A Visit to the Caves of Han. Described and illustrated by the T. T. Club. London (Sampson Low & Co.): 1883, sm. cr. 8vo., pp. 159, plan and illustrations. Price 5*s*.

A short account of the subterranean course of the Lesse, which, not far from Rochefort, flows for about a mile and a half through a series of chambers honeycombed in rock, opening into each other, and abounding in stalactites, is given in Murray and Baedeker's Guide Books for Belgium; but the little volume now

being noticed, edited by J. Moyr Smith, contains details of these curious caverns or grottoes, with many illustrations. Some of these are from photographs taken by electric light by M. Armand Dandoy, of Namur, but the majority are from sketches by the pseudonymous writers of the account, and include many points of scenic and architectural interest on the road. A topographical plan of the caverns is appended, with insets of the entrance of the Lesse, and of the village of Han-sur-Lesse and its environs.

Neumann, Gustav.—Geographisches Lexikon des Deutschen Reichs. Leipzig (Bibliographisches Institut): 1883, cr. 8vo., pp. lxxviii. & 1416, forming two vols., maps and plates, with Atlas, fo., Spezialkarte des Deutschen Reichs, bearbeitet von Ludwig Ravenstein. (*Dulau*: price 18*s.*)

This very complete Gazetteer of the German Empire is preceded by a geographical and statistical sketch to date, and contains 29 plans of cities with separate explanatory text, canal and railway maps, and plates of the armorial bearings of the confederated and purely Germanic States. The Atlas contains 30 pages in 7 columns of Index names, 5 pages of statistical explanatory matter, 10 sheets of maps, scale 1 : 850,000, and statistical maps showing distribution of population, religion, industries, and products.

AFRICA.

Penning, W. Henry.—A Guide to the Gold Fields of South Africa. Pretoria (J. F. Celliers): 1883, cr. 8vo., pp. 87, map.

The author, recently engaged on our Geological Survey, has travelled in South Africa for a period of two years, during which he contributed occasional notes (now collected and supplemented) to local newspapers. He discusses the Lydenburg, Blyde river, Zoutspansberg and Waterberg, Tati, Northern, and De Kaap Gold-fields, with an appendix on routes, conveyances, &c. The map is confined to Eastern South Africa.

Stevenson, James.—The Water Highways of the Interior of Africa, with Notes on Slave-hunting and the means of its suppression. From Transactions published by Authority of the Council of the Glasgow Philosophical Society, May, 1883. Glasgow (James Maclehose & Sons): 1883, 8vo., pp. 28, maps.

This paper, read before the Glasgow Philosophical Society on March 28th last, and now separately published, describes the three great waterways to the centre of the continent, viz. by the Lakes, the Upper Nile, and the Congo, with general observations. In one Appendix, the Portuguese tariff of customs for Mozambique is reproduced, and in another an extract is given from Leo's History, referring to the Congo region.

The maps (by Ravenstein) are two of Equatorial Africa, scale 1 : 23,000,000, one showing elevations, mission stations, Bantu northern limits, and the stations of the International Association and African Lakes Trading Co.; the other giving tracks of slave caravans and hunters, and the principal districts harassed by them. A general map of Africa is also given, showing amongst other things the line where water traffic is interrupted by falls, and the watershed between inner and coastal rivers.

AMERICA.

Ogilvy, John.—An account of Bermuda, past and present. Compiled and summarised from numerous sources, with original observations. Hamilton, Bermuda (S. Nelmes): 1883, 8vo., pp. 64.

The growing reputation of the Bermudas as a health-resort has caused Dr. Ogilvy (Surgeon-General, and principal medical officer, Bermuda Command) to put together this systematic account of the islands, which contains a sketch of their physical geography, geology, water supply, climate, health conditions, flora, fauna, &c., and a bibliography of the literature.

ARCTIC.

[The Dutch Expedition of 1882.]—Verslag van den Vijfden Tocht van de Willem Barents naar de Noordelijke Ijszee in den Zomer van 1882, uitgebracht aan het Bestuur der Vereeniging Willem Barents. Haarlem (H. D. Tjeenk Willink): 1883, 8vo., pp. 133, map and illustrations.

This Report, which follows the account of the fourth voyage of the *Willem Barents* noticed in the last volume of our 'Proceedings,' p. 517, gives (after a list of preparations and instructions) an account by Lieut. C. Hoffman of the operations of the fifth voyage of the same vessel in the Barents Sea, from the start on 9th May from Amsterdam to the return at the end of October 1882. It will be remembered that the primary object of this expedition was to relieve Mr. B. Leigh Smith. A sketch of the zoological observations made during the voyage is added by J. J. Scheltema, with a list of dredging stations, and Dr. J. J. V. Haak makes a health-return.

The map gives route, ice-positions, &c., with special inset of the Matotchkin Strait. The illustrations (some of which are by chromolithography) represent the meeting with a northern sealer in the Barents Sea, Vardö, Altgläubigen Bay, two views of the Matotchkin Strait, and some ice phenomena.

GENERAL.

Müller, C. — Klaudiou Ptolemaiou Geographikē Huphēgēsis. Claudii Ptolemæi Geographia. E Codicibus recognovit, Prolegomenis, Annotatione, Indicibus, Tabulis instruxit Carolus Müllerus. Vol. I. Pt. I. Parisiis (Firmin-Didot): 1883, sm. 4to., pp. 570. (*Dulau*: price 12*s.*)

Contains (after a list of 39 copies of the text consulted, commencing with the Paris one of 1401, and including the Ingolstadt *editio princeps*) the first three books, describing Europe, with the Prolegomena. The Greek text and a fresh Latin translation are given in parallel columns, with very ample notes, commentaries, and references, far exceeding the text in bulk. The maps are to appear in the 3rd volume.

Parmentier, J. & R.—Recueil de Voyages et de Documents pour servir à l'Histoire de la Géographie depuis le XIII^{e} jusqu'à la fin du XVI$_{e}$ Siècle. IV. Le Discours de la Navigation de Jean et Raoul Parmentier de Dieppe. Voyage à Sumatra en 1529. Description de l'isle de Sainct-Dominigo. Publié par M. Ch. Schefer, Membre de l'Institut. Paris (Ernest Leroux): 1883, large 8vo., pp. xxix. and 202. (*Williams & Norgate*: price 13*s.* 6*d.*)

This 4th volume of the series recently commenced by MM. Ch. Schefer and H. Cordier (of which the first two volumes were noticed in our 'Proceedings' for 1882, pp. 772 and 773; and the third, 'Les Corte-Real et leurs Voyages au Nouveau-Monde,' by Henry Harrisse, has not yet been received), contains an introductory and annotated sketch of the life and work of Jean Parmentier, the poet-geographer of Dieppe, born in 1494, especially as regards his tragical voyage to Sumatra with his brother Raoul in the ships *Pensée* and *Sacre* in 1529. An historic outline of the earlier visits to this island and the political events connected with it after the commencement of the 16th century, is also given. M. Schefer has no hesitation in attributing the original editorship of the journal to Pierre Crignon, a man of literary attainments, who accompanied Parmentier on the *Pensée* as astronomical observer; and he is also of opinion that the narrative of the voyage to North America in vol. iii. of Ramusio ("Discorso d'un Gran Capitano di Mare Francese del Luogo di Dieppa") is due to Crignon, who probably introduced into his account events that happened after Parmentier's death.

The annotated text of the voyage to Sumatra and of the incomplete description of St. Domingo and the coast of Nombre de Dios is followed by a poem composed by Parmentier during his passage from Madagascar, and by Crignon's elegy upon his two unfortunate companions; and the volume concludes with a reproduction of the chapter on Hispaniola from "Le Grand Insulaire et

Pilotage" of André Thevet, contained in MS. in the French National Library. M. Schefer is convinced that Thevet in writing this had before him the description (possibly in a perfect state) of St. Domingo, forming the second part of Parmentier's discourse.

Ziegler, J. M.—Ein geographischer Text zur geologischen Karte der Erde, mit einem Atlas. Basel (Benno Schwabe): 1883, 8vo., pp. xvi. and 314 [no index], Atlas oblong 8vo. (*Dulau*: price 16*s.*)

This posthumous work discusses (1) the geological distribution of rocks, (2) hypsometric proportions, (3) the Sea, (4) geological periods, (5) results of geodeticians and physicists, (6) the bearing of those results on the geographical distribution of rocks, (7) the functions of temperature in the formation of the earth's constituents, (8 and 9) the Triassic and Tertiary periods in their respective geographical bearings, (10) the gradual level-alterations of individual points of the earth's crust, (11) the volcanic phenomena of recent geological periods, (12) an attempt at a geographical chronology of the earth's crust, having regard to the constant operations of rotation, attraction, and temperature, and (13) a conclusion in which an attempt is made to determine the relations of geography with the other natural sciences. The atlas is of various physical points, taken from known authorities.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Deutschland, General-karte von——, nebst einem Theile der angrenzenden Länder mit besonderer Berücksichtigung der befahrenen Eisenbahnen gezeichnet von Franz Fried. Scale 1:1,860,000 or 25·4 geographical miles to an inch. Artaria & Comp., Wien, 1883. Price 2*s.* (*Dulau.*)

Italia, Carta d'——. Scales 1:50,000 or 1·4 inches to a geographical mile, and 1:25,000 or 2·9 inches to a geographical mile. Istituto Topografico Militare, Firenze, 1883. Sheets:—**28**—I. Ollomont; II. Aosta; III. Morgex; IV. Gran S. Bernardo. **41**—I. Gran Paradiso; IV. Valgrisanche. **42**—II. N.O. Vistrorio, II. S.O. Castellamonte, II. N.E. Ivrea, II. S.E. Strambino; III. Cuorgnè; IV. Champorcher. **43**—I. N.E. Gattinara, I. S.E. Carpignano Sesia, I. N.O. Masserano, I. S.O. Roasenda; II. N.E. Arboro, II. S.E. Villata, II. N.O. Buronzo, II. S.O. S. Germano Vercellese; III. N.E. Salussola, III. N.O. Azeglio, III. S.E. Santhià, III. S.O. Borgomasino; IV. N.E. Bioglio, IV. N.O. Andorno Cacciorna, IV. S.E. Cossato, IV. S.O. Biella. **44**—III. N.E. Novara, III. N.O. Biandrate, III. S.E. Vespolate, III. S.O. Borgo Vercelli. **57**—I. N.E. Vercelli, I. S.E. Balzola, I. N.O. Ronsecco, I. S.O. Trino; II. N.E. Casale Monferrato, II. N.O. Mombello Monferrato, II. S.E. Vignale, II. S.O. Moncalvo; III. N.E. Gabiano, III. N.O. Cocconato, III. S.E. Montiglio, III. S.O. Castelnovo d'Asti; IV. N.E. Livorno Piemonte, IV. N.O. Cigliano, IV. S.E. Crescentino, IV. S.O. Saluggia. **58**—IV. N.E. Robbio, IV. N.O. Palestro. Price of each sheet 7*d.* (*Dulau.*)

As very considerable progress has now been made in this survey, it is thought that the following particulars may be interesting, and perhaps clear up some of the difficulties which, without explanation, are sure to exist in the case of a series of maps which are published in different scales for different localities.

It seems to have been originally intended to publish the whole of this map on the scale of 1:100,000, but in 1873 permission was granted from headquarters to the Military Topographical Institute to issue sheets of this map on the following enlarged scales:—all the valley of the Po, the lower valley of the Arno, the suburbs of the principal cities, parts of the mineral districts, and

other places of special importance on the scale of 1:25,000; the remaining portions will be published on the scale of 1:50,000. The projection is a modification of Flamsted's, the origin of the co-ordinates is found by the intersection of the meridian of Naples with the 40th parallel. As these sheets are produced in as rapid and economical a manner as possible, no pretence is made to artistic elegance; great attention, however, has been given to the exactness of particulars, for the various uses for which they may be required. At first the sheets were reproduced by photolithography, but this process, though rapid, was found to give such inferior results, that other methods were tried, and at present they are reproduced by photography on copper and transferred to stone, and it is intended that all the sheets which have previously been produced by photolithography shall be republished as soon as they can be printed by this improved process. The elevations are shown by contour lines at the distances of 5 and 10 metres apart, according to the nature of the country. Up to the present date we have received 305 sheets on the scale of 1:25,000 and 418 on the scale of 1:50,000.

There is a seeming contradiction in the manner in which these sheets are numbered, that requires explanation. They are all numbered as being sheets of a map on the scale of 1:100,000, whereas the actual sheet is probably drawn to the scale of 1:25,000 or 1:50,000, and is only a section on an enlarged scale of the sheet on the scale of 1:100,000 indicated, this latter being divided into four for the 1:50,000 and sixteen for the 1:25,000.

Oesterreichisch-Ungarischen Reiches, Karte des——, von Joseph Ritter von Scheda, Kaiserl: Königl: Oberst. Mit den Grenzen der Bezirks-Hauptmannschaften und Comitate. Verlag u. Eigenthum v. Artaria & Comp: in Wien. Ausgabe 1883. Scale 1:993,000 or 13·6 geographical miles to an inch. 4 sheets. Price 12*s.* (*Dulau.*)

Scotland, Reduced Ordnance Maps of——, by John Bartholomew, F.R.G.S. Scale 1:127,000 or 1·7 geographical miles to an inch:—Ayr and Nithsdale District. Moffat and Hawick District. Ross-shire. Adam & Charles Black, Edinburgh, 1883. Price 2*s.* 6*d.* each, coloured; 3*s.* 6*d.* mounted on cloth.

In the Map of Ross-shire an orographic system of colouring has been introduced. Previously, in this series of reduced Ordnance Maps, the counties have been distinguished by different colours, and the contours by faint lines, but according to the system introduced in the map of Ross-shire, contours are drawn at intervals of 500 feet, and the spaces between these lines are coloured in tints which are varied from verdant green in the lowlands and valleys, to dark tints for the mountain peaks and ridges. This system, which has long been in use in physical maps, is well adapted for all the requirements of tourists' maps.

Wien, Neuester Plan von—— mit Vororten (bis Schönbrunn). Scale 1360 feet to an inch. Wien: Verlag u. Eigenthum von Artaria & Comp. 1883. With Index. Price 2*s.* (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st May, 1883.

1-inch—General Maps:—

SCOTLAND: Sheet 110 (Hill-shaded). 1*s.* 9*d.*

IRELAND: Sheet 172 (Hill-shaded). 1*s.*

6-inch—County Maps:—

ENGLAND: Berks, sheets 9, 13. 2*s.* 6*d.* each. Berks, sheet 7, with Wilts, sheet 6, Gloucester, sheet 61, and Oxford, sheet 43. 2*s.* 6*d.* Derby, Quarter Sheets, 16 N.E. (this completes sheet 16); 23 S.W., 23 S.E.; 24 N.W.; 25 S.W. 1*s.* each. Shropshire, Quarter Sheets, 49 S.W.; 54 N.W., with Montgomery, 38 N.W. 1*s.* each.

IRELAND: Longford (revised): Sheets 8, 14, 22. 2*s.* 6*d.* each. Sheets 17, 26. 2*s.* each.

25-inch—Parish Maps:—

ENGLAND: **Bedford**: Clophill, Area Book. Flitwick, 7 sh. Henlow, Ar. Bk. Lidlington, 9 and Ar. Bk. Ridgmont 9. Steppingley 7. **Cornwall**: Cardinham, Ar. Bk. Menheniot, Ar. Bk. Pillaton 9. St. Neot, Ar. Bk. **Leicester**: Isley Walton, Ar. Bk. Langley Priory, Ar. Bk. **Monmouth**: Area Books of the following Parishes:—Llanhennock, Llanmartin, Llanvihangel, Lantarnam, Malpas, Rockfield, Skenfreth. **Norfolk**: Deopham 7 sh., Hackford 5, Kimberley 6, Wicklewood 8. **Shropshire**: Frodesley 6. **Suffolk**: Burstall 5.

Index Maps:—

SCOTLAND: Index to the County of Kincardine. Scale 5 miles to 1 inch. Index to the County of Inverness. Scale 7 miles to 1 inch. Index to the County of Renfrew. Scale 5 miles to 1 inch.

ASIA.

India.—Graticule Plates, printed on dry paper, to be used for the projection of maps of India on the scales of 2, 4, 8, 16, 32, and 64 miles to an inch. With a memorandum describing their use. Surveyor General's Office, Calcutta, 1883.

Brass Graticule plates with perforations have been in use for many years in the Topographical Survey of India; these having proved expensive to construct, it has been decided to engrave copperplates, from which any number of copies, by dry printing on paper, may be struck off, it being believed that these dry prints will afford as accurate projections as the brass plates, if they are kept carefully spread out flat, and are thoroughly dried before they are used, so as to drive off any dampness they may have imbibed from the air; and as a scale of inches has been engraved on each plate, a simple comparison with a standard scale will show at once the amount of expansion due to hygrometric causes.

The third edition of Sir H. Thuillier's 'Manual of Surveying for India,' chapter xvi., page 336, contains a full description of the method of producing the Graticule of Maps, and those interested in the subject will do well to refer to it. These Graticule Plates are projections in the form of quadrilaterals, the lengths of the sides and diagonals of which have been obtained from the Auxiliary Tables to facilitate the calculations of the Survey of India (also given in Sir H. Thuillier's work), which were prepared by Baboo Radhanath Sikdhar, chief computer, and since revised by J. B. N. Hennessey, Esq., F.R.S., &c. The arrangement is such that any graticule square is obtainable corresponding to a given latitude from the equator to 35° north or south (thus embracing the limits of British India) in the case of the large scale plates; and from the equator to 46° in the case of the smaller scales, or as far north as the Upper Caspian. The manner of using these prints in making a projection is similar to that given by the late Colonel Blacker in his memorandum of instructions for the use of the Surveyor General's Office, the only difference being that the prints themselves are pricked through instead of the perforations as in the case of the brass plates. In opposition to any objections that might be advanced as to the mechanical nature of this method of delineating the parallels and meridians of a map, or that it is not solely referable to any of the demonstrated projections, it may be stated that, if these prints be used with care, the limits of error are extremely small, and that even these small errors are readily detected by a comparison of the lengths of the diagonals of any selected figure: if these are identical no error exists; if not, the projection must be corrected. These graticule prints of squares of Latitude and Longitude much facilitate the projection of maps, and, in an extended survey, greatly assist in the preservation of a uniformity of scale.

Indian Government Surveys:—

Indian Atlas: Sheet 65. Parts of Bisahir (Kanawar) and the Native State of Teeree (Foreign Gurhwal) and Chinese Tartary.—**Bombay Presidency**: Trigonometrical Branch, Survey of India. Sheets Nos. 19 and 21 of Cutch. Scale 1 inch to a mile. Season 1881–82.—Konkan Topographical Survey. Sheets 77 N.E.,

N.W., S.E., and S.W. District Thana. Scale 2 inches to a mile. Season 1880–81. Sheets No. 85 N. and S. Island of Bombay, and Districts Thana and Kolaba. Scale 2 inches to a mile. Sheet No. 86. District Kolaba and Habsan State. Scale 1 inch to a mile. Season 1880–81. Sheets No. 86 N. and S. District Kolaba and Habsan State. Scale 2 inches to a mile. Season 1880–81.—Deccan Topographical Survey. Sheet No. 61. Districts Satara, Sholapur, and Kaladgi, and Kolhapur Agency. Scale 1 inch to a mile. Season 1880–81. Sheet No. 68. District Kaladgi, Nizam's Dominions, and Kolhapur Agency. Scale 1 inch to a mile. Season 1880–81.—**Bengal Presidency**: North-West Provinces Survey. Sheets No. 3 N.E., N.W., S.E., and S.W. District Saharanpur. Scale 2 inches to a mile. Seasons 1878–79–80. Sheets No. 16 N.E., N.W., S.E., and S.W. Districts Muzaffarnagar and Meerut. Scale 2 inches to a mile. Seasons 1878–79–80. Sheets No. 18 N.E., N.W., S.E., and S.W. District Meerut. Scale 2 inches to a mile. Seasons 1879–80–81. Sheets No. 29 N. and S. Districts Muzaffarnagar and Meerut. Scale 2 inches to a mile. Seasons 1879–80–81. Sheets No. 30 N. and S. Districts Muzaffarnagar and Meerut. Scale 2 inches to a mile. Seasons 1879–80–81. Sheets No. 31 N. and S. District Meerut. Scale 2 inches to a mile. Seasons 1879–80–81. Sheet No. 65. Districts Moradabad, Tarai, and Rampur State. Scale 1 inch to a mile. Seasons 1848–52, 1864–66, 1871–2, and 75–76. Sheet No. 66. District Moradabad and Rampur State. Scale 1 inch to a mile. Seasons 1864–65–66, 1871–72, and 75–76. Sheet No. 67. District Budaun and Rampur State. Scale 1 inch to a mile. Seasons 1865–66, and 76–77.—Oudh Revenue Survey. Sheet No. 138. District Rae Bareli. Scale 1 inch to a mile. Seasons 1861 to 63.—Lower Provinces Revenue Survey. Sheet No. 12. District Noakholly. Scale 1 inch to a mile. Seasons 1864–65.—Assam. District Kámrúp, 1865–69. Scale 4 miles to an inch. —Assam. District Goalpara. Scale 4 miles to an inch. Seasons 1855–59 and 64–75.—The Provinces of Bengal, Behar, Orissa, and Chota Nagpore. 1882. Scale 16 miles to an inch. 4 sheets.—Plan of the Town of Calcutta. Scale 6 inches to a mile. 2 sheets. 2nd edition.—**Trans-Frontier Surveys**: Map of the Routes followed by Explorer D.C.S. from Darjeeling to Shigatze during 1879. Explorer G.S.S. in Nepaul during 1880 and 1881. Explorer G.M.N. from Shigatze to Khamba Jong during 1880, also some routes of former Explorers, and some of the results of the Surveys by the Darjeeling Survey Party during 1879–82. Compiled by Captain H. J. Harman, R.E., June 1882. Scale 16 miles to an inch.—Biluchistan Topographical Survey. Scale 2 miles to an inch. Preliminary Sheets Nos. 2, 3, 4, 5, 6. Seasons 1880–81–82. (Preliminary Map.) Biluchistan Topographical Survey. Scale 1 inch to 4 miles. Season 1880–81. 2 sheets.—Trigonometrical Branch, Survey of India. Sketch Map illustrating the explorations of M—— S—— in and around Badakhshan, 1878 to 1881. Trans-Himalayan Exploration Map No. 14. Scale 12 miles to an inch.—Sketch Map of the Hazarajat. Scale 16 miles to an inch. Compiled from native and other information by Lieut.-Col. E. P. Leach, R.E., and intended to illustrate a report submitted to the Surveyor-General of India, on the 8th December, 1880.—**Indices**: Index Chart to the Great Trigonometrical Survey of India showing Col. Lambton's network of Triangulation in Southern India, the meridional and longitudinal chains of Principal Triangles, the Base Lines measured with the Colby Apparatus, &c. &c. Completed to Oct. 1st, 1882. Scale 96 miles to an inch.—Index to the Sheets of the Atlas of India, Dec. 1882. Scale 125 miles to an inch.—India, showing the progress of the Imperial Surveys, to 1st Oct., 1882. Scale 125 miles to an inch.—Index Chart of the Guzerat Survey. Scale 24 miles to an inch.—Index Chart of the Cutch Topographical Survey. Scale

18 miles to an inch.—Index to the Sheet Maps of the North-West Provinces and Oudh, on the scale of 1 inch to 1 mile. 1882. Scale of Index 32 miles to an inch. —Index to the Sheets of the Gwalior and Central India Topographical Survey, on the scale of 1 inch to 1 mile. 1882.—Index to the Sheets of the Topographical Survey, District Kohat. Scale 16 miles to an inch. 1882.—Index to the Sheets of the Mysore Topographical Survey, on the scale of 1 inch to 1 mile. Scale of Index 32 miles to an inch. 1882.—Index to the Sheets of the Rajputana Topographical Survey, on the scales of 1 inch to 1 mile, and ½ inch to 1 mile. 1882.—Index to the Survey of South Sylhet and Tipperah Hills. Scale 8 miles to an inch. 1882.—Index to the Sheets of the Bhopal and Malwa Topographical Survey, on the scale of 1 inch to 1 mile. 1882.—Index to the Sheets of the Khandesh and Bombay Native States Topographical Survey, on the scales of 1 inch to 1 mile, and 2 inches to 1 mile. 1882.—Index to the Sheets of the Baluchistan Survey, on the scale of 1 inch to 2 miles, and 1 inch to 4 miles. 1882.

AFRICA.

Egypt, Map of Middle——. Compiled at the Intelligence Branch, War Office, in 1882, principally from the Surveys made by the Egyptian General Staff and Mr. John Fowler, C.E. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Lithographed at the Intelligence Branch, War Office, March 1883.

Flegel, Robt. Ed.—Vorläufige Kartenskizze der Gegenden im Süden des Benuë nach den Reisen und Erkundigungen von Robt. Ed. Flegel. Scale 1 : 6,000,000 or 82·1 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1883, Seite 241. Justus Perthes, Gotha. (*Dulau.*)

Mudirië Rohl, Originalkarte der Reise des Dr. Emin Bey durch die——. Sept. bis Dez. 1881. Entw. u. gez. von B. Hassenstein. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 8. Justus Perthes, Gotha. (*Dulau.*)

ATLASES.

Switzerland. — Topographischer Atlas der Schweiz im Masstab der Original-Aufnahmen nach dem Bundesgesetze vom 18. Dezember 1868 durch das eidgenössische Stabsbüreau unter der Direktion von Oberst Siegfried veröffentlicht. XXI. Lieferung. Scale 1 : 50,000 or 1·4 inches to a geographical mile. No. 250. Walensee. 273. Jenins. 274. Partnun. 399. Mustathal. 403. Altdorf. 407. Amsteg. 490. Obergestelen. 493. Aletschgletscher. 533. Mischabel. 534. Saas. 535. Zermatt. 536. Monte Moro. XXII. Lieferung. Scale 1 : 25,000 or 2·9 inches to a geographical mile. No. 20. Laufenburg. 21. Koblenz. 22. Klingnau. 52. Andelfingen. 85. Chaux-du-Milieu. 157. Bremgarten. 174. Affoltern. 175. Thalwil. 216. Fischenthal. 308. Colombier. 349. Rüschegg. 351. Gantrisch. J. Dalp, Bern. Price 13*s.* each part. (*Dulau.*)

EDUCATIONAL.

Palæstina.—H. Kiepert's Volksschul-Wandkarte von——. Neue, nach der Englischen Aufnahme von Palæstina W. vom Jordan berichtigte Bearbeitung. Scale 1 : 300,000 or 4·1 geographical miles to an inch. Verlag von Dietrich Reimer, Berlin, 1883. 4 sheets. (*Dulau.*)

Chart showing Mr Leigh Smith's Track to Franz Josef Land and Boat Journey to Novaya Zemlya in 1881-1882.

H. Sharbau R.G.S. del

Outward Track in the Eira ——— Homeward Track in Boats .....

Pub.d for the Proceedings of the Royal Geographical Society 1883

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Visits to the Eastern and North-eastern Coasts of New Guinea.

By Wilfred Powell, Esq.

(Read at the Evening Meeting, May 7th, 1883.)

Two years ago, 1881, I communicated to this Society a short paper on some observations that I had made on the great island of New Britain, the western extremity of which lies only 60 miles from the eastern coast of New Guinea. During my cruises in these seas I visited New Britain and New Ireland twice, spending altogether upwards of three years in these little-known islands, but I shall not say anything further on this subject as my paper on these islands had the honour to be published in the 'Proceedings' of this Society, in the third volume, and the surveys, that I had the opportunity of making, of considerable portions of the coasts, were adopted by the Hydrographical Department, and have been incorporated in the Admiralty charts. My purpose now is to give the Society some account of what I saw of New Guinea. In 1875 and 1876, and again in 1877–78, as also on my return from New Britain in 1879, I visited the northern and eastern side of New Guinea, and on one occasion spent eighteen months in exploring the coast and harbours and in studying the native tribes. I did not, however, make an actual survey of the coast, but my coasting voyage then extended the whole length of this side of the island, from China Straits to Point Durville, a distance of over 1000 miles.

In 1881 I also resided for some months on Thursday Island, Torres Straits, and during various cruises in the pearl-shell fishers' boats had good opportunity of observing much and learning much about the southern coast of this wonderful island of Papua. Of the western and south-west portions I cannot say anything. But this is of less consequence as Mr. D'Albertis has given a very good account of the north-western peninsula, and Mr. Wallace's excellent description of the neighbourhood of Dorey, on the north-western coast, must be familiar to most English readers.

Torres Straits, the narrow sea studded with islands which separates our colony of Queensland from New Guinea, has become of late years better known in consequence of the great development of the pearl-shell trade. Very extensive beds of this mollusc have been discovered in the straits, and are now worked by fleets of large boats, built on purpose, and owned by firms for the most part belonging to New South Wales. They are manned by natives from all parts of Polynesia, each boat is captained by a native who is known as the diver, wearing the diver's dress and doing all that portion of the work. The shell is a large bivalve with a thick lining of mother-of-pearl, which is used in various manufactures.

It is in consequence of these pearl fisheries (as I said before) that Torres Straits has become a place of considerable importance, and this has led to the more careful survey of the numerous dangers attending its navigation. The port, so-called, of Thursday Island, is a shelter formed by several neighbouring islands. It was established as a harbour of refuge for shipwrecked mariners, but of late years the traffic has enormously increased in consequence of the growing importance of the northern ports on the Queensland coast, to which these straits are the high road. This port has also become the rendezvous and starting-point for travellers, being, of course, the nearest outpost of civilisation to the island of New Guinea; and from thence, for many years, missionaries have taken their departure to the malarious and swampy districts in the Gulf of Papua, and returned thither to recover their health when wasted and worn out with the New Guinea fever. From this place also started a large party of Australian miners, attracted by the report of gold, to the interior, near Port Moresby, few of whom returned to relate their miserable failure.

The coast of New Guinea immediately opposite Thursday Island is occupied by the delta of the Fly river, which is fully described in Mr. D'Albertis' book. Here the coast is low, swampy, and malarious, as indeed it may be said to be throughout the whole of this Gulf of Papua. It is an unfortunate circumstance that the most accessible portion of this island viz. that bordering Torres Straits on the north, is the most unhealthy. The aspect of this part of the coast, as indeed an examination of the chart would lead one to expect, is that of a low-lying alluvial region, the outlet of some of the largest rivers in New Guinea and the drainage of the southern portion of the island being in this direction. Besides the Fly, and the Aird, there are many hundreds of other rivers and creeks, all flowing through the low and swampy ground forming this south coast, which is covered with mangroves, in some places for miles inland. This is the hot-bed of fever, and the low hills, which will in some cases be found within a mile or so of the coast, are not high enough to raise any one living on them above the pestilential influence. Here is found, I believe, amongst these natives the only *authenticated* cannibalism that exists in New Guinea, and here (as I learnt from a

missionary), only amongst isolated tribes, who are much despised by the others. Indeed the whole of the native tribes inhabiting the Gulf of Papua are of a decidedly lower type than those in the more elevated districts to the east. No doubt further inland it is possible a higher type may be found on the beautiful slopes of the Owen Stanley Range, and even on the coast, further east as it becomes more mountainous and less humid, an unmistakable improvement is to be met with in the physique of the natives. From Mullens Harbour to China Straits the coast is comparatively high and the inhabitants appear to be more intelligent, but this coast is so much better known, through the voyage of Captain Moresby and the accounts of Mr. Chalmers and other members of the London Missionary Society, who have numerous stations here, than almost any other part of New Guinea (although this is only for a short distance inland) that it is unnecessary for me to dwell further upon it.

On my way to China Straits in 1877 I passed Brumer Islands, which are of importance in an anthropological point of view, for here it appears to me that the two races meet, and intermingle; the darker and more barbarous type of the Gulf of Papua and the south-west coast, and the lighter-coloured and better-featured type, more resembling the Polynesian, inhabiting the south-east and the eastern peninsula. Off Brumer Islands I observed in 1877 a shoal which does not appear in the Admiralty charts and is of considerable extent, lying on the northern side of these islands; the least water on it appeared to be about two to three fathoms, where now is marked 22, no bottom.

The next point of importance I reached was China Straits. I think there can hardly be prettier scenery anywhere than these straits, viewed as you enter them, with Basilisk Island on your right hand, Blanchard Island on the left, and Moresby Island rising with its hills and peaks immediately astern, whilst ahead are Heath Island on the one hand and Hayter Island on the other, Dinner and Middle Island cropping up right in the centre of the straits. All the islands are extremely picturesque in their varied hilly surface and rich tropical vegetation.

Beyond the islands rise the grand and majestic mountains of the mainland, beautifully timbered to their summits, but having here and there cleared patches of cultivation which show that the natives are numerous and industrious; indeed in some places one might imagine oneself on the coast of Italy, and the yam and taro plantations might be vineyards. Far inland looms the mighty range called the Cloudy Mountains, of which Mount Simpson and Mount Thompson are the most visible peaks.

Here we find that the missionary work has made its way, there being a teacher of the London Missionary Society on the mainland and another on Hayter Island, a number which has probably been increased since my last visit. Each of the larger islands that lie immediately to

the eastward of China Straits, viz. Hayter, Basilisk, and Moresby Islands, is well populated with an intelligent and peaceful race of inhabitants, especially Hayter Island, and all show great signs of cultivation. Possession Bay, where Captain Moresby raised the British flag in the Queen's name in 1873, lies to the western extremity of Hayter Island.

While we were here (in Possession Bay), many canoes came off to visit us with several women in them, whose presence we were not favoured with at any of the other places on the coast. It was curious to observe how they appeared to have quite the upper hand of the men, abusing and scolding them if they did not get close enough to the vessel's side to trade with us. When this object was attained it was amusing to see how they settled down into company manners, not giving way to eager excitement like the men, but giving orders to the latter what to sell and what to take in exchange. One lady had on a very brightly coloured grass petticoat, which we were anxious to obtain but felt some delicacy in asking for. However the mate at last summoned up courage to point to it. She had evidently been watching our faces, and pretended to be ashamed to take it off. Whereupon the mate showed her several attractive articles of trade to try and induce her to sell it; at last producing a tomahawk (a far higher price than is usual to give for such an article), she took it off—and we found she had another on underneath it—thus by a piece of clever acting getting double the price she would otherwise have received. The other natives seemed to think it a very good joke.

I must add that before this lady left she was very anxious to part with the remaining petticoat, but we did not feel inclined to pay the same price for it, partly from a wish to avoid the sacrifice of her modesty, and partly, perhaps, lest her stock of underclothing should prove too great a strain on our stores.

On leaving China Straits one passes Mekinley Island, on which I spent some months, and a little further to the north and east lies China Rock. I mention this latter because it increased from a small patch of coral, when I first saw it in 1875, to a sandbank of considerable size in 1879; whilst between it and Mekinley Island lie two patches of sunken reef, which did not exist in 1875, and have grown since. These latter were of live coral, and seem to show how very fast coral reefs will grow in certain places, whilst in others they appear to remain stationary for centuries.

After leaving the straits there are two routes to the northward; one past Milne Bay to Goschen Straits, the other to the north-eastward towards Normanby Island and Cape Ventenat, so named by D'Entrecasteaux.

I wish I could carry my audience, even in imagination, to such a sight of grandeur as this island presents, especially when the sun is sinking behind the innumerable peaks and crags which fringe the

eastern shores of Normanby Island. On the south coast of the island, I see marked on the chart, "a remarkable gap"; it must indeed be a remarkable one, where all are so remarkable. Peaks rise above peaks, with pinnacles rising from them as from some huge cathedral towers, and often hanging, as it were, suspended over a chasm as deep as they are lofty. Mr. Goldie, a botanical collector who explored the mainland near Port Moresby some years ago, has recently been travelling in Normanby Island. I wish he were here to-night to give us a more detailed account of its wonderful natural features.

The next point we arrive at is Welle Island. This island is the beginning of one side of a system of reefs that inclose the largest known lagoon in the world; the Luscanny Islands form part, and they extend with but few small openings from Welle Island to La Grandière Islands, which with Trobriand Island form one side of the lagoon, while the reefs from Trobriand Island to Riche Island (so named by the French, part of New Guinea), and the coast of New Guinea from thence to East Cape form the other sides. The area of sea inclosed measures in width about three degrees of longitude, and in length one degree and a quarter of latitude. Within this immense expanse of fringe-reef the water is comparatively shallow, and I am of opinion that it has once formed a portion of the mainland; there is, however, a channel of deep water near the land. Few of these reefs are marked in the chart, but I had a good opportunity of observing and noting their extent in 1876, when I was cruising about them for several months, and I am sorry to say I made no actual survey of them.

The coast-line of New Guinea from East Cape to Huon Gulf presents much the same appearance as the point immediately opposite China Straits, the land being high and well wooded, with many signs of cultivation. A few of the natives came off to us in their canoes, bringing coco-nuts, yams, taro, and other edibles, but they do not put to sea except in light weather, as they do not appear to have such large canoes on this coast as they have to the southward amongst the islands.

We come next to Cape King William. A more beautiful and healthy spot for settlement than this can scarcely be found in any tropical country in the world; the coast is bold and steep, rising in many places sheer from the sea, to the height of about 1000 feet and ranging inland to the Finisterre Mountains in terraces and tablelands of open grass-country, with every facility for cattle-grazing, well watered with streams that take their rise in the heights some 15,000 feet above. But it has a defect in having no sufficient harbour. The natives were at first hard to conciliate, but a few days of intercourse overcame their suspicion of us, and I think it often has been this that has led visitors to parts of this island to make a wrong estimate of these natives. They generally approach a vessel in their canoes very warily, with spears and arms all ready, in case any hostile intentions should appear on the part of their

wonderful visitors. They shout and sing, making warlike gestures with their spears, bows and arrows, and tomahawks, but this quite as much to keep up their own courage as to intimidate the new comers, and on a first acquaintance this is very likely to mislead those on board a vessel, as it has every appearance of hostility; but *my* experience has led me to the conclusion that this is not really so, but is rather intended to mean, "If you come to fight, we are ready for you." Let this be only looked at in the right light, and one can see how very strange, not to say alarming, it must be for these natives, who have perhaps only travelled a few miles at the most from their birthplace, to have visiting them so new a people, and in so strange a conveyance, of whom probably they have no previous knowledge. However, I found that in a short time this feeling of timidity was overcome by a little quiet intercourse, and by the distribution of a few pieces of red cloth and beads; indeed, so successful was I in the present case, that in about a week after arriving I was invited on shore by an old chief, and travelled with him a considerable distance inland.

After landing, we climbed a very steep cliff of about 500 feet, and at the summit found fine grassy tableland stretching some miles inshore, having a gentle rise, terminating again in another abrupt cliff, which was considerably higher than the one we had first ascended; this again was surmounted by open tableland. This curious formation of country leads in this way terrace by terrace up to the immediate base of the Finisterre Mountains, which rise in majestic grandeur to an altitude of at least 13,000 feet, the cliffs appearing to be of basaltic formation, whilst granite boulders are scattered about the sea-shore. The plains above clearly show that there is a volcano or volcanoes in the vicinity, by the large quantities of rotten pumice-stone scattered about and overgrown by grass. The natives use obsidian for a great number of purposes, such as for shaving their heads and faces, carving wood, &c. The summit of the Finisterre range being nearly always obscured by clouds and mist, I had no opportunity of observing whether there was an active volcano or not among the mountains; but judging by the indications, I strongly suspect that there is.

I passed a very interesting and pleasant two days with my new acquaintances, who are undoubtedly superior in their intellectual qualities to the natives of the Gulf of Papua, being excellent agriculturists, to which pursuit they turn, in fact, nearly the whole of their attention, as there are no reefs or harbours of any magnitude near enough to facilitate the maritime pursuits of fishing or trading in canoes which is so much indulged in by other coast tribes of this island. They use also a system of irrigation, by means of pipes made of bamboo joined together with gum, obtaining the water from the numerous streams that flow from the mountains above. The labour employed on their yam, taro, and banana plantations is chiefly that of slaves taken in

battle from the inland tribes. Their houses, which are generally grouped together in considerable numbers, are of the beehive form, built of bamboo, with posts of coco-nut palm stems, and are thatched with the leaves of the sugar-cane, their sides being covered in with mats of pandanus leaf, which are rolled up during the daytime to allow a free current of air through the hut, the flooring being composed of pieces of small broken coral, which forms a very white, clean, and wholesome pavement; in each group of houses there is generally a larger one for the purpose of meetings, and for the accommodation of strangers.

Astrolabe Bay, which lies a little further to the northward, would make a good port for this part of the island should it ever become a settlement of white men, especially if a large river which I believe empties into the south-west bight, prove to be navigable. I say "believe" because I have never actually seen this river; but by the yellow and muddy appearance of the water, as well as by the quantity of drift-wood in this part of the bay, I was led to conclude that a large river does discharge itself near here. It was here that the celebrated Russian ethnologist and traveller, M. Miklukho-Maclay, resided for some months, in order, I believe, to make anthropological investigations.

Before going any further northward on the coast of New Guinea, let me say a few words as to the volcanoes of the island group lying immediately to the east, and separated from it only by comparatively narrow straits. It is a somewhat curious fact that there are no volcanoes in New Ireland, whilst they abound on the north coast of New Britain. On the south side of the latter island there is no appearance of there ever having existed a volcano. I will trace them here, for they are remarkable as forming a complete chain of burning mountains, and which in after years, when New Guinea is better known, will no doubt be found to stretch across the centre of that island and form the connecting link with the volcanic islands found on the western side. On Blanche Peninsula, in New Britain, is the mountain called the "Mother," extinct, and a smaller active volcano. It was during the eruption of the latter in May 1878 that an island 70 feet in height rose in Blanche Bay during one night. In the centre of Gazelle Peninsula stands Mount Beautemps-Beauprés, an extinct volcano; further east stand the stately "Father and Sons," two of which are active, as well as one on Du Portail Island lying close to them. Between these latter and Deception Point lie many smaller craters, the point itself being composed of several large volcanoes, whilst the islands of Cicquel Raoul and Willaoumez each have their own crater. Cape Gloucester, the western extremity of New Britain, as seen from a little distance at sea, presents the appearance of being one mass of fire from the numerous craters there in action. Tupinier Island is an active volcano; Rook Island is extinct, but has the appearance of not having been long so; as are also the craters of Lottin, Long, and Crown Islands. Rich and Dampier Islands are both volcanic, but are not

actually active; whilst in Vulcan Island the name speaks for itself. Here we have a complete chain of volcanoes extending from the Solomon Islands through New Britain to the east coast of New Guinea, and beginning again apparently on the western side in the Malay Archipelago. It is therefore only reasonable to suppose that it is continued through the island of New Guinea.

The coast to the northward of Astrolabe Bay continues to be high and precipitous for the most part, but the Admiralty chart of this coast, as it is at present, is so wanting in smaller details that one can hardly form any idea from it of the numerous beautiful bays and harbours that exist which, with the salubrity of the high tableland and the continuous and plentiful supply of water, make it admirably adapted to settlement. The numerous mountain streams with beautifully clear cold water are quite a feature of this part of the coast. They descend from the uplands by many cascades, or flow in deep ravines. The terrace-formation of the land and its great elevation give rise to a great diversity of climate, and Europeans would find situations, not far from the sea, well suited for settlements.

In Broken Water Bay we found good anchorage pretty close in shore. The natives here came off to us in their canoes, but we were unable to overcome their excessive shyness and timidity, even by throwing towards them pieces of stick wrapped in red cloth or with strings of beads tied to them. They had spears and arrows apparently tipped with obsidian, but as they hardly came within two or three hundred yards, it was impossible to speak with certainty on this point. This bay is a far more extensive one than is marked on the chart, and runs further into the land; the shore is thickly timbered, although the higher land further in is clear and open grass-country, as are the slopes of Mount Jullien. The Schouten islands off the coast are high, densely wooded, and appear to be uninhabited.

At Passier Point are extensive lagoon reefs and several small islands. The natives here most evidently appeared by their gestures to imagine that we had come from the sun. This, I found, is a very common impression amongst natives who have seen little or nothing of white men; it is so on the coast of New Britain, where they explain it by stating that the ship had come from the horizon, where the sun rises or sets, and is supposed by them to be "the beginning of the other side of the sky," as they term it. This is somewhat similar to their superstition that the moon is the canoe that carries the spirits of the departed to and from the horizon, when they depart from or descend to visit the earth; and when I tried to puzzle them by saying that the moon was sometimes bigger than at others, they replied that it was in consequence of there being more spirits to carry. The natives of Passier Point were very friendly and sold us quantities of fish and turtle; they also brought off plenty of black-edged pearl-shell.

The shore at this point is low and sandy, having very little rise for a considerable distance inland, but the land then rises more rapidly, forming the flank of a range of mountains which appear to be thickly covered with timber.

The coast from Passier Point to Humboldt Bay, although hilly, is of much less altitude than further to the southward about Cape King William, but it appears rich land, with plenty of coco-nut-palm groves and wild nutmeg trees; there are also numerous little indentations and bays in the coast which are not shown on the chart, but which will be available some day as excellent ports for a coasting trade. In several of them we had very friendly dealings with the natives, who appeared extremely astonished at our white skin, and were much delighted to find that it turned red on being rubbed, but I think the thing that surprised them most was the fact of our wearing hats, and at one place they fairly tumbled out of their canoes with fright when I lifted mine off, evidently thinking that I was removing a portion of my head. Their canoes are fine large boats, much ornamented with carving and shells, some of the larger ones carrying sails somewhat similar in shape to the wing of the flying fish.

There are several unimportant river mouths in this part of the coast, which bring down a large quantity of drift-wood, and here we picked up a good-sized bough of the camphor-wood tree.

Humboldt Bay is the best-known harbour on this part of the coast, having been visited by the *Challenger* in her voyage round the world. It is also, I believe, the site of a Dutch missionary station, although we saw nothing of it when we were there; this may have been owing to the shortness of our stay, as well as to the fact of our anchoring on the southern shore, not far from the entrance to the bay. However, we found here natives some of whom could say a few words of English, and who were very eager for European manufactured tobacco, though I cannot say that they impressed me with being a very friendly or attractive race; they are distinctly different from those of Cape King William, being darker and of a more Malayan type, and appear treacherous and noisy.

The coast between Humboldt Bay and Point D'Urville is for the most part high, rocky, and rugged, though much broken into bays and creeks, but parts (and these appear to be the mouths of streams) are low and swampy, having thick forests of mangrove bushes.

Before reaching Point D'Urville (which was the last point on this coast we visited) the eastern mouths of Ambernoli river are passed, and they certainly appear to be navigable for small vessels at least; should this prove to be the case on closer investigation, then I believe that this river will become a highroad into the interior, and that an exploring party travelling up it southward, and another, in the opposite direction, up the Fly river, might meet in the interior, and do much to

open up to science a land that is at present shrouded in the darkest mystery.

To conclude this necessarily short sketch of the coast, let me add one word on the immense value of this island in a commercial point of view, in anticipation of a question which will be, I take it, the first to be asked by many Englishmen, in prospect of New Guinea becoming a British possession. As far as I have had an opportunity of judging, the island is rich in natural products. I will mention a few:—Tortoise-shell, pearl-shell, ivory-nuts, gum, sandal-wood, camphor tree, sago, arrowroot, ginger, sugar-cane, coco-nuts, ebony, and bird-of-paradise plumes, whilst native tobacco is grown in large quantities.

When the island is opened up, no doubt valuable minerals will be found; gold is known to exist, and I have seen fine specimens of copper, and black sand that contains tin, brought from New Guinea. Indeed it is well known that nature has been exceedingly bountiful to the islands of the Malay Archipelago and Australasia; but I believe this island, although the last to be developed, will prove to be the most favoured.

As to climate, I have tried to show how easy it would be, on the north-east coast, to escape the malarious fevers which cling to all low-lying country in these latitudes.

Should the annexation by Queensland be concluded, I trust she will not make the great mistake of securing only the south coast (which is no doubt the most necessary to her safety), but take the whole island. This I urge in the name of humanity for the sake of the natives, as other nations do not always treat their dark-skinned subjects with the same consideration as the English.

In conclusion, I may state I have great hopes, before the end of the present year, of being able to undertake an expedition to examine the coasts (and as far as practicable the interior) of the islands of New Ireland, New Britain, and the Admiralty Group, with the northern and eastern coasts of New Guinea, and to combine with this anthropological, ethnological, and zoological researches; but in order to accomplish this work, which should not be delayed, funds will be needed to the amount of 6000*l.*, and it is to be hoped that the scientific societies of Great Britain will not be found backward in helping on so essential a work.

The President, in introducing the author of the above paper, said that Mr. Powell had spent eight years of his life in that region. He first made himself known to the Geographical Society by a paper on New Britain (where he had spent three years), which was read before the Geographical Section of the British Association at Swansea in 1880, and was afterwards published among the papers of the Society. He had coasted along New Guinea and the adjacent islands, and had explored with care no less than 1200 miles of the eastern and north-eastern coasts. Perhaps of all the large countries of the world New Guinea was the one of which least was known. People were apt to speak of it as, next to Australia and Borneo, the largest island in the world; but recent explorations, and calculations made by competent German geographers, had established the fact that it was a larger

island than Borneo. The area of the main island was 303,241 English square miles, or adding to it the islands immediately adjacent, just as the Hebrides and the Isle of Man were added to the British Islands, 311,958 square miles, thus proving to be 19,134 square miles larger than Borneo. England and Ireland together were 121,000 square miles; France was 204,000 square miles—making together a total of 325,000 square miles. New Guinea was therefore nearly as large as the British Islands and France put together.

After the reading of the paper,

Admiral Moresby said they must all have listened with a great deal of gratification to Mr. Powell's account of his persevering exploration of the island of New Guinea, which was now attracting such a great deal of attention. As it was his (Admiral Moresby's) lot to be amongst the first to bring to light the eastern and north-eastern shores of that island, he naturally felt particular interest in the paper. At the time when he made his voyage, and afterwards when he wrote his book on it, he was enthusiastic on the subject, and met with severe criticism. The views which he held were regarded by many as not well founded; but he was sure even then that though the question might sleep it would awaken again, and now after eight years it had done so, and he did not think it would be again allowed to sleep until it was decided one way or the other to whom this great island was to belong. He agreed with Mr. Powell in saying that England ought to take the whole island; but it was the south-eastern part which dominated over Australia, and which was of the greatest importance with regard to Queensland. He therefore hoped that Mr. Powell would tell them something more about the healthiness, the produce, and so forth, of the south-eastern peninsula. Many inaccurate accounts had appeared in the newspapers about what he (Admiral Moresby) did in 1873 and 1874. He had made no attempt to annex any part of New Guinea, for that had been done seventeen years previously by Lieutenant Yule, under the orders of Captain Owen Stanley, near Redscar Bay. All that he did was to discover that New Guinea did not extend so far to the eastward by 50 miles as had been supposed. Of course that was officially reported, and it remained for the Government to do as they pleased about it. It was strictly within the right of every British subject to hoist the flag of his nation on any land which he discovered. That act implied nothing except the postponement of a claim by any other nation until his own Government had decided what their action would be. He was glad that Mr. Powell had spoken of the new route to China through Goschen Straits and Dampier Straits, for that was the shortest route from Australia by some 300 miles. It had been very much inveighed against, and it had been said that it never would come into use; but he felt more certain now than he did in 1874 that it would eventually become the great highway of commerce between Eastern Australia and China. Some people considered that this could not be, because the trade-winds were uncertain, the monsoons irregular, the currents variable, and reefs abounded; but the days of sailing vessels were fast passing away, and the time would come when that sea would be as well surveyed as the English Channel. He could quite bear out Mr. Powell's remarks with regard to the north-east coast. It was a grand, a splendid coast, abounding in beautiful harbours. The whole country was apparently very healthy and very fertile, with an enormous amount of cleared land, and the natives were friendly, so far as their fears would allow them to be so. On Moresby Island, after a good deal of searching, he found one small specimen of gold, and no doubt there was more there. He also found steel sand in Robert Hall Sound and in various other places. One great reason why he thought New Guinea should belong to England was that the English were the closest to it; and if it were said that we could not populate it, what other nation could? The island belonged to

England by its natural geographical position; and even for the sake of the inhabitants themselves, England ought to take possession of it, for she would take more care of them than any other nation.

In answer to a question by General Sir J. H. Lefroy as to the authority for the draughtsman to divide the island into two sections on the map by a line running down the meridian of 141°, Sir Henry Rawlinson said that he presumed that the line indicated the separation between the two races, the Malayan and the Papuan. No doubt it was only intended as a rough ethnological division. The President further explained that, for lack of more definite knowledge, they had followed Mr. Wallace's map, in which it was shown that the north-western portion of the island was claimed by the Dutch.

Mr. G. W. Rusden asked if Mr. Powell found the natives more friendly in places in which Baron Miklukho-Maclay had obtained influence by his kindly treatment of them, than in the other portions of New Guinea visited by Mr. Powell?

Mr. P. L. Sclater said he had paid a great deal of attention to the natural history of New Guinea. The Dutch certainly had claim to some consideration with regard to the island. For many years they had had settlements in the north-western portions, which were regularly visited by their ships. The corner of the great bay of Geelvink, where Mr. Wallace and other naturalists had resided, was certainly more or less under the dominion of the Dutch, and there were places on the western coast to which Dutch ships continually went. Therefore, however much he might feel disposed to stand up for everything that England could fairly require, he thought that Holland had already attained too great a footing on that side of New Guinea to enable England to claim the whole island. The Italians also were entitled to a great deal of credit for their investigations into the natural history of the island. Signori Beccari and D'Albertis had made more than one expedition into the country; in the first place in the northern portion of the island, and afterwards up the Fly river. The best work on the birds of New Guinea, which had lately appeared, was also by an Italian author, Count Salvadori, and that book was based mainly on the discoveries of Beccari and D'Albertis. Holland would hardly be likely to give up her claim to the western portion of New Guinea.

Mr. Coutts Trotter asked Mr. Powell how he proposed to develop the north-eastern portion. From all the Dutch reports the natives appeared to be very independent, and apathetic, without any energy or ambition. The Dutch had attempted to make some settlements, but they had always failed, owing partly to the climate and partly to the fact that they could not make any use of the natives. If gold were found there, a rush might take place from Australia, and serious collisions might arise with the natives, and arrangements should be made to prevent such a state of things.

Mr. Powell replied that he knew very little of the coast in the neighbourhood of Redscar Bay, but from what he had learned from the missionaries he had been led to believe that it was a good place for settlers. Port Moresby had been made the head station of the London Missionary Society working on that part of the coast, and therefore the climate must be more salubrious than in the Gulf of Papua, which was exceedingly unhealthy. Some years ago some miners, in search of gold, started inland from the Gulf of Papua. He believed they found a considerable quantity of gold, though not sufficient to pay them—about one pennyweight per ton of alluvial mud. Five of them returned alive, out of thirty or forty who started, the others having died in consequence of the fever, and when they were down with the fever very likely the natives murdered them. He could say that the part of the coast which he had examined was certainly healthier than the Gulf of Papua, and that it

was therefore better for forming a settlement. The great place for the protection of Australia was Torres Strait. An enemy's ship could pass through to the northward of Warrior Reef without being observed by the settlement at the Government station on Thursday Island. Indeed, if a fort were built on Friday Island or Goode Island, which was supposed to command the Prince of Wales' Channel, it would not prevent the enemy's ship slipping round by Warrior Reef, and running down to the coast of Australia, and demanding a heavy indemnity from some of the towns on the eastern coast of Queensland, such as Cookstown. The enemy could threaten to shell the town if they did not pay one million pounds of money, an amount which was often deposited in the bank from the goldfields. At present there was no telegraph from Thursday Island to the southern parts; but if forts were built in New Guinea, Goode Island, and Mulgrave Island, then it would be impossible for any ship to creep through, because they could not pass at night-time. There was no occasion for laying torpedoes; all that was required was to have good earthworks and heavy guns. It would be very awkward for Queensland if an enemy were in possession of the southern coast of New Guinea. Queensland, probably, had not more men to put into the field than would form one regiment, and therefore could not protect herself, and it was very questionable whether she would be able to have the assistance of any ships belonging to the British fleet. She would have to telegraph to Sydney for them, and they would take some time to go a distance of 1600 miles along the coast. The indemnity would probably be paid before any such vessel arrived.

The PRESIDENT, in proposing a vote of thanks to Mr. Powell, said he had no doubt that, from this day forward, exploration would be more frequent than in the past along the coasts of New Guinea. It was clearly Mr. Powell's opinion that, in order to guarantee the safety of Queensland, the island of New Guinea should be occupied. The Geographical Society had nothing to do with these political questions, but all Englishmen must feel that if the colonists had set their minds upon getting possession of the island, they would do it. The colonists in sparsely populated countries were apt to have rather rough hands, and the most enterprising were not always the most humane or civilised representatives of our country. Therefore, if there was a probability of New Guinea being seized, he echoed the wish that it should be taken possession of in such a way as to insure the rights of a people who appeared to be singularly friendly. He wished that he could say that the English mode of dealing with the inhabitants of uncivilised countries was always superior to that of other nations, for there were many dark passages in English history with respect to our dealings with native races. He hoped that if New Guinea was to be taken possession of by England, it would be carried out in such a way that we should have no cause to blush for it.

A Visit to the Masai People living beyond the Borders of the Nguru Country. By J. T. LAST.

(Read at the Evening Meeting, June 25th, 1883.)

Map, p. 568.

ON November 2nd I made up at our station, Mamboia, a small caravan, consisting in all of about twenty men, and started on a visit to the Masai, who live just beyond the borders of the Nguru country. My intention was first to form a good acquaintance with their neighbours the Wa-nguru, and through them to obtain access to the Masai living at

Nduba and Bokwa. I thought it would be easier to reach the Masai by the help of the Wa-nguru, many of whom are little better than slaves to them, than if I trusted simply to my own resources.

From Mamboia we went on to Madidi, passed the villages, and thence on to Bwagamayo. Here we left the road we had traversed last year when we went into the Nguru country, and took another path bearing more towards the east. This took us to Berega. Here we arrived at a large village, where several of my porters lived. We met with a very ready welcome, the people supplying us with fire, water, and good sleeping room. The people themselves are very quiet and friendly, but live in continual fear of raids by the Wa-humba. They are a mixture of Wa-megi, with a few Wa-nguru. Their villages consist of a number of round huts in the middle of a large tembe or fence. The huts are generally very dirty, and abounding with vermin of various descriptions, including rats, which are innumerable and most audacious. The people themselves are not remarkable for cleanliness, and wear but little clothing—a piece of skin or dirty oily cloth behind and before. The want of cloth seems to be a small matter with them, as they make up for this deficiency by well smearing their bodies with a compound of oil or fat and red clay (castor-oil or bullock's fat is generally preferred).

The women are here, as elsewhere, very fond of ornaments: these consist of beads of various kinds and colours worn round the loins and neck; sometimes these accumulate to a weight of 18 or 20 lbs. They are also very fond of wearing iron, brass, and copper bracelets, wristlets, anklets, and collars. These vary in size, according to the means of the wearer, or of her husband or father. Most of the people have a few goats and fowls; the goats they are very loath to part with, but fowls they sell at the rate of a yard of cloth each.

We were up and off again at 5.30, on the way to Mwandi. Previous to leaving I gave the people of the house where I slept, two yards of cloth for their kindness to us. We passed over undulating ground, rough and stony, as if of quartz broken up into very little pieces. This was very trying to the men's feet. Now and then, on ridges of red clay (*udongo*), there were a number of "table-topped mimosa" and large calabash trees. After a time we came to a river some 20 yards wide flowing with a stream of brackish water some 18 inches deep. The whole bed was thickly overspread with coarse grass and reeds rising some 15 feet high. On the opposite bank were some fine Mpalamusi and other trees. Just before entering Berega we passed through a thicket of trees bearing very long and sharp thorns; these are called by the natives *nukongoi*. At Berega the water is very brackish.

Nearly all the distance between Berega and Mwandi Kwa Madila the country is clothed with belts of thick scrubby bush, varied with flat, open places having a stunted tree-growth. The soil is chiefly red earth, varied with large rocky surfaces and rough stony ground. We reached

Mwandi about 7.15, and after a stay of about fifteen minutes continued our march to Mahedu Kwa Kifaru, accompanied by some of the natives who had some business at that village. The country was similar to that travelled over the previous day. About two-thirds of the way between Mwandi and Mahedu we came to a remarkable rock. It was about 15 feet high, and had in its centre a large cavity some 25 feet wide and 130 feet long. This had a good amount of drinkable water, 3 feet deep except at one end. There was a mark which showed that the water was some 3 feet higher at the last wet season. This water-pool forms the chief drinking place of all the forest beasts round about. It looked very beautiful, being covered with white water-lilies all in full flower. We rested here for fifteen minutes, and then went on to Mahedu. Here we came to a village of large size for this country, having a population of about 300. A case connected with witchcraft was being tried by two groups of men assembled in a valley near the village, and I was able, by dint of remonstrances and advice, to stop the proceedings, and thus prevent the brutal sacrifice of a life, which seemed to be imminent.

The contending parties joined and said that my words were good and that they would let the matter drop. They bid each other farewell, and separated. I went with the Chief Kifaru and his men to his village. The chief was apparently very grateful for what I said in the matter, and avowed that he did not himself believe in witchcraft. He pointed out a good place for my tent in his village, and after a short time brought me a good sheep and some Indian cornflour. We passed a pleasant evening with the natives. There are here a number of men who are always ready to go on short journeys to the Masai and other districts. Many came and offered themselves to me, and when they found I did not need them they begged that I would send for them should I want men at any time.

At 6 the next morning we were on the road again. I made the chief a present in return for the sheep. The road was very rough for about an hour and a half, afterwards becoming more level. We passed the hill and villages of Kiziwa about an hour to the west of us. Thence we went on to the little stream Nkulukumba. The water was so bad that we could only just wash our mouths with it. After fifteen minutes' rest we went on to Chaguwari Kwa Majuni. Here there is a good river of drinkable water. The people came out to see and salute us. From Chaguwari we went on to Maguo, which place we reached at 12.45. Here there are four good-sized villages. In every village we have yet camped in I find people who know me. At Maguo there were some natives who had lately been working at Mamboia, and had spoken of me in such a manner on their return that the village people gave us a very good welcome. The people are very superstitious. In the village there are a number of long poles and bamboos, at the top end of which small calabashes are hung containing various charms against sickness, war,

wild beasts, and others in favour of women bearing many children and the gardens producing plenteously. Outside the village there is on every path a number of small clay images of men and women. These are the appointed guardians of the road, supposed to preserve the village from both man and beast. In the village there is a M-humba with two wives and four children living, who all have much better features than the natives of the district. The man was very friendly disposed, and as he knew Ki-nguru we were able to talk together for some time. There is here a fine long valley planted with bananas, but as they are seldom hoed they do not bear much. The water is very good. Food is either scarce or the people wish to make a good profit out of us. A few men here offered themselves for caravan work to the Masai country should I need them.

We rested here all Sunday. During the day we had the ordinary Church service in Swahili, at which many of the natives attended. On Monday we started again at 6 A.M., and marched over undulating ground for two hours, at the end of which we reached the deserted villages of Mlenga. Only a few months ago, when the men of the villages were out one day pombe drinking, a party of Wa-humba came up, and seeing there were no men present, attacked the women, killing some, taking the others captive, and carrying off all their cattle and goats. The Wa-humba find a ready market for their captives amongst the Nguru people, who again dispose of them as slaves to the Swahilis and coast people (Wa-rima). All the gardens of this district are now running to waste forest again. There are at Mlenga two remarkable rocks or boulders standing on the crest of a hill. They are called Mawega Mlenga; standing out so prominently they form good landmarks from a considerable distance. The largest is a rectangular mass some 50 feet high and 20 feet on each side. The smaller one is nearly as high, but rises to a point.

After resting for a quarter of an hour we started again for Kiseru. The country was more or less rough all the way to the river Bóroma, and abounds with game; buffaloes, rhinoceros, and elephants. There must have been at least half-a-dozen elephants just before us this morning, judging from the foot-prints we passed. A sportsman might find plenty of work here, for the natives never hunt in the district, being afraid of the Wa-humba, who would, I believe, do no harm to a European hunter. At the Bóroma we got some excellent water. Just before reaching the river we passed by a deserted village, abandoned for fear of the Masai. From what I learnt, I cannot help thinking that the natives brought the evil upon themselves. One day two Masai came to the village, and a native came out and insulted them by asking, "What kind of Masai are you? You are not Masai, but Wa-humba." This was a great insult to the Masai, as they have the bitterest hatred to all Wa-humba, and cannot bear to have the name of Humba mentioned

before them. The Masai did not say much, but went home and reported how they had been insulted. The men at once took up arms and went to the village to demand an explanation. The man who committed the offence came out again bravely enough, but was at once speared, as was also another man who came to help. The natives then ran away, and the Masai returned home, considering they had sufficiently avenged the insult.

On reaching the Bóroma we followed its banks until it took a turn to the north. At this bend it received the Luseru, along the edge of which we travelled for about three-quarters of an hour, till we reached the first villages of Kiseru. The people about here were very poor, having scarcely any food, they themselves being obliged to go to Kibanti to buy what they wanted. The chief of the village gave me a fowl as a mark of respect, saying that being poor he had nothing better to give. It was very wet during the latter part of our journey to-day, and kept on raining all day and night. I was able here to purchase one of the native hoes, made of ebony. Iron is very scarce, and what they have they use for making spears and arrow-heads.

The next day was wet, but as we were anxious to move on, we started about 6.30 A.M., and went on to the hill Sagasa. We passed round the south side of this, and then went on up the Luvumo valley. There is here an abundance of sugar-cane, and formerly much land was cultivated, but agriculture is now neglected because of the Masai and Wa-humba. We rested a short time, then crossed over the little river, and ascended the hills to the north. In about an hour and a half we came to the village of Dangi, who is said to be the chief of all the Nguru people around for several miles. The rain fell in heavy showers all the way, so that when we reached Dangi's village we were in anything but a comfortable state. The chief was absent, but the people gave us a good welcome and house room, and I quickly changed my wet clothes for dry ones. After I had been here about an hour the chief came home. He also was drenched to the skin. After he had rested a little he came, with about twenty others, to see me. I told him of the object of my visit, and that I wanted by his help to form the acquaintance and friendship of the Masai. Upon the second of these points I talked for some time with Dangi and his people. I did not say much about his going with me to the Masai, as I knew he would wish to know me better before he would consent. After this he and his people went away, and I did not see him again till near the evening. During this time he had called my guide, a M-nguru, by name Muhina, and learnt all he could about me. I also, knowing that the man would not help me much unless I gave him a present, had put by two or three cloths, so when he came I called Muhina, who gave him the present and explained to him fully in Ki-nguru what I wanted. Dangi at once agreed to do all he could to help me. Not knowing the customs of the Masai, I was for starting the

next morning for their villages, but Dangi said this would be a most unwise thing to do, for coming upon them so suddenly they would be sure to think we had some evil design. His advice was that we should first form the acquaintance of Limba and Saja, and under their escort visit their villages. As he knew best how to act I followed his advice.

In the evening there was a great pombe-symposium, in honour of a child having cut its first teeth. A pot of pombe containing about ten gallons was set in the middle of a square for the men, and a similar one in another place for the women. When all was ready, some six or eight men rushed out of their houses and fired off their guns. Then an old woman came, and with a ladle sprinkled about half a pint of the pombe on the ground, at the same time crying out "Chambiko, Chambiko." After this sort of libation she rushed up and down the square followed by some twenty others, young and old, crying out "Chambiko, Chambiko." This continued for about half an hour; then drum-beating commenced, and the pombe-drinking set in and lasted all night. The pombe spilt on the ground was said to be a kind of thank-offering to God, because of the health of the child; they also prayed that the child might be preserved and grow up in health and strength.

The whole of this part of the country is very hilly, and watered by many streams, the chief of which, the Lusugalu, flows just below Dangi's village, and has excellent water. On the sides of the hills the Masai feed many of their numerous herds of cattle. The natives of the soil are nearly all Wa-nguru. But they can hardly be said to be possessors of the land, for being subjugated by the Masai, they are in a state little better than slavery. No M-nguru living near the Masai would dare to refuse any request they might make. These Wa-nguru are very superstitious, as may be noticed by the number of charms they use, and also by their conversation. They have some slight acquaintance with the coast people, especially at Pangani, by which they are not in the least improved in either manners or character. Having been cheated shamefully by the Wa-rima and Swahili, they have learnt the evil habit, and are ready to cheat wherever they see the chance, only laughing when found out.

On Wednesday morning we sent two men, each with a kitambi as a present to the chiefs Limba and Saja. I sent a present that they might know that the messengers came from a friend; had they gone empty-handed the chiefs might have been doubtful.

Whilst the messengers were gone, a number of the natives came to see me, amongst them an aged Masai, who took his seat close by me. He looked at me and did not speak; he looked again, and I saluted him in Ki-gogo, to which he replied. I then saluted him in the Masai language, which pleased him much, and there was a general laugh all round. I was busy writing at the time when he came in, so after a

little talk with him by the help of a native, I resumed my work. He wondered what I was doing, and asked one of the natives what it was. The native, thinking probably that I should not understand, told him "Endabira endasimi,"—he is making witchcraft medicine. On hearing this the Masai wanted to leave at once, for though the Masai are much feared by all surrounding natives, yet they in their turn are very fearful of witchcraft. Before the Masai could rise I made the native recall his words, and told him, by the help of others, what writing was and its use. When it was thus explained to him he sat down again, and remained for some time. I also took the opportunity to tell both the Masai and the natives that Europeans had no acquaintance with witchcraft—they neither knew it, used it, nor feared it.

On Thursday morning Dangi, the Nguru chief, came, with some of his people, to see me. I here explained to them that I was not travelling about to seek ivory or cattle, but simply to get to know people, that I might teach them the way of God. There is far less respect paid to dealers in ivory and cattle than to travellers, for the Swahili dealers being great rogues, all other traders are judged by the natives to be of the same character. I spent all the morning talking with Dangi and his people. At about 2 P.M. five Masai came to me from the village of Eleiduruba. They had heard of my arrival, and had come to see me. Of these, three were about medium height, the other two about 6 feet. The features of the former three were very little better than those of the ordinary negro (probably they were of mixed origin, as I hear the Masai have many Nyamwezi and Gogo slaves whom they keep as wives); the two tall men had features more closely resembling the European type, long noses, and thin lips. Their hair was short and woolly, very similar to that of the common natives.

When these five Masai arrived they would not come into the village, but sat outside under a large tree. I went out to see them. I saluted them all in turn. They shake hands after the common European fashion. This is their native custom. The salutation is as follows:—One man goes up to another, and seizing his hand exclaims, "Shore" (friend), to which the other one replies "Shore; Ngassa," resp. "Ngassa"; "Subbai," resp. "Subbai"; "Ebai," resp. "Ebai"; then to all "Endai Subbai," resp. "Subbai." They then sat down to hear what I had to say. I told them, through Dangi, why I was come, and of my desire to form a friendship with them and their people. This involved a great number of speeches backwards and forwards. At last when all had said what they wanted to say, they consented that my words were good. After this they wanted to make a closer personal examination of myself. My hair and beard was an object of great wonder to them, so my cap had to come off a good number of times to gratify their curiosity. The old man of the party was as superstitious as he was curious. He ventured to touch my beard, and then looking down on the ground he

spat some two or three times, exclaiming "Engai, Engai" (God, God). Thinking they meant that they thought I was a god, I at once told them I was only a man like to themselves, and they must not name me as Engai. I afterwards found that spitting and exclaiming "Engai, Engai," was only a way of expressing very great astonishment. From my head they went to my feet. They thought that my boots were really part of my feet. Wondering at the sight, they inquired amongst themselves, "Where can his toes be?" At this I had to take off my boots, then my socks, so that they could see my bare feet. They were much astonished at the sight, and when they ventured to touch my feet, they touched as lightly as if they were afraid they would break them. They seemed very much surprised at what they had seen. I put my socks and shoes on again at the first opportunity, and after talking we had a little business to attend to. The five men wanted to know what I had to give them, seeing I had come as their friend; they would not be sure that I was their friend if I said so simply by word of mouth, and gave them no other proof. As I wished to gain their confidence I gave them each two yards of cloth. This they received, and then there was much more speech-making; this ended in their saying that two yards of cloth was not a very good present and that they would be better satisfied if I gave each an additional two yards. This, after a little talk with Dangi, I did. Then more speech-making. At the end I was told that they could not take me at once to their village as the women and children would be all frightened and run away, and so would cause much bother. I was obliged to consent. About 4 P.M. they said farewell, and took their departure.

Soon after this I was informed that a Masai followed by some six Wa-nguru had arrived. This was Saja, the son of Elangetéi, the chief of all the south-eastern portion of the Masai country. He is a young man about twenty-five years of age, over 6 feet in height, of very dark colour, fine features, approaching the European type, with long straight nose, thin lips, and high forehead. He is held in great fear by all who know him because of his great strength, but he is more loved than feared because of his many friendly deeds. He came to see me soon after his arrival, and saluted. He said, "I am Saja; all people know me, and will tell you of me." We talked together for a short time, and then he went to one of Dangi's houses. Fortunately this Saja knows Ki-nguru well, and understands Swahili when he hears it, though he is not able to speak much. He came with Dangi and others in the evening to see me, and we spent the evening in talking about our respective customs and manners, looking at my things, &c. They all left about 10 P.M., and I went to bed.

Saja came alone the next morning, and I told him in Swahili and Ki-nguru why I was travelling and what I wanted to do. He told me that what I said was very good, but I should find the Masai not a very

easy lot of people to deal with, their "Shore, shore" (friend, friend) was only for what they could get. I told him that this would not hinder the white man from going amongst them. About noon two of the men who came yesterday and the under-chief Eleiguruba came to take me to their village. I should have gone at once, but as Saja is the son of the greatest chief, and wants me to go to his father's village, I was obliged to decline. Whilst talking with Eleiguruba (who seemed a very nice fellow) there arrived three Masai—two men and a woman from Elangetéï, bringing as a present a good goat, saying that the chief was away on ivory business at Sumátia, but if I could wait for four days he would come and see me. As this delay would keep me longer than I had intended to stay, and my cloth was getting short (I only took just what I thought would be necessary, thinking that the less I took the less there would be to steal, should the Masai use force with me), I was obliged to decline, and resolved to go the next day to Eleiguruba's village, on the north-east side of the Masugula hills. So I send my salaams to Elangetéï, with the message that want of time hindered me from waiting for him now, but I had hopes of seeing him at some future time. Had I been sure that Elangetéï would have come in four days, I might have waited, but Africans set so little value on time that he might have kept me waiting a week or two, or more. In the evening Saja and a Masai friend came in to see me, and we had about three hours of pleasant conversation together.

I proposed to start early on Saturday morning for Eleiguruba's village, but some native affair turned up in which Dangi was concerned, which kept him engaged for three or four hours. During this time Saja and his friend were with me talking. Saja was apparently thoughtful, and weighed in his mind what he heard before he believed it. The other was too light-hearted to take much heed of what we talked about. A little after noon Dangi was ready, so he and his brother, five of my men, and myself started. On the road we saw large herds of cattle browsing on the hill-sides, or else going down to the river to drink before going home. On the way we passed some six villages of Wa-nguru who are subject to the Masai. We reached the Masai village a little before 4 P.M. About a quarter of a mile from the *bomba* (village) we met Eleiguruba and some five or six other Masai. We had a few words with these, and then Eleiguruba took us to the village. Here we were stopped and a few questions asked.

A man and woman then came out, and took us to the house where we were to sleep. We placed our things outside the house, and sat down, a number of the people coming to look at us. After we had sat about ten minutes, we were called out again. There was some talking between Dangi and a Masai called Oleiboni, for ten minutes or so, and then he led us back to our house. We were quickly surrounded by the men first, who, when they were satisfied, made place for the women. My head,

hands, and feet had to undergo a general inspection by them all. They were much surprised at my appearance, and many were the exclamations of "Engai, Engai" (God, God). After this inspection was over, and the people were apparently satisfied as to the peaceful intentions of their visitor, they went off about their usual work—the men to drive the cattle to their respective standing places, and the women to go round and milk. While this was going on, one of the Masai chiefs fetched out a fine cow, which they killed after their own fashion. This is done by inserting a long, sharp, narrow knife into the back of the neck, about half-way between the head and shoulders. The animal drops at once. The skin round the wound is then raised all round, so as to form a bag. The blood enters this, and while it is yet warm the men drink it; first one takes his fill, and then resigns his place to another. When the blood is all drunk, the animal is skinned, cut up, and roasted. This is all done outside the village. The Masai killed the cow for us, and after drinking its blood, left it for the men to cut up and roast. After the cow had been killed I returned to the village, to see what was going on there. I found that the cattle, oxen, donkeys, sheep, and goats had all been put in their places, and the women were going round with their low calabashes milking the cows. As there was rather a scarcity of grass, the cows gave but little milk. At no time do they give more than half the quantity of a good English cow. When all the work was over, then the chiefs of the village collected together outside, and called Dangi (who is really their slave), to inquire what presents I had brought them, seeing I had come to them as a friend. Dangi knew what I had, and told them; but as nothing can be done in East Africa without a deal of speech-making, the item of presents kept them employed till nearly 10 o'clock. During this time Eleiguruba, his father, and two others, were sitting with me outside the house together. They wanted to know all about the white man's country, and whether they had cattle and other things. Dangi and I and the Masai sat talking for about half an hour; then all went to sleep, Dangi outside the village, I and three men inside the hut set for our use. It was rather a hard bed, and the house close and smoky, but as I was tired I slept well till about 4.30 A.M., at which time I awoke, got up, and went out. The morning was fine and fresh, so I sat and enjoyed a smoke at the hut door. The dawn was just breaking. I could just discern the men and women walking about among the cattle. This they do all night long. At 5 A.M. the women go out to milk. This work lasts till about 6, at which time each herd of cattle is turned out and taken to its own grazing place. The cattle are all out and cleared off the place by 7 A.M. The boys generally herd the cattle, but when there are not sufficient boys the women turn out and attend to the business, the cattle being out grazing from 6 A.M. till 5 P.M. If the boys or women are hungry during that time, they simply catch a bullock and kill it. The women kill their own, and roast it themselves, when out in the grazing places. When at

home they do not kill, but have to take what the young men please to send them. Generally they get the head, viscera, and all the rough odd pieces, the young men being careful to keep all the best parts to themselves. The women and children who were not engaged milking cows were busy collecting the fresh cow-dung which had fallen during the night; with this they were plastering the outside of their houses, against the coming rains. During the night the camp is always well watched. None of the young men sleep in the village, but in all weathers they go out in parties of three and four, and surround the village with a circle of camps at about half a mile distant. Here they watch and sleep by turns, so that it would be very difficult for any enemies to reach the village without their knowledge. There is, in fact, in every community of Masai, always some one on the alert. These same young men, when not engaged in fighting, are out in the forest all day, at a short distance from the herds of cattle, so that should any enemy appear they are there ready to help. Around each village there may be seen a great number of carrion birds—the kite, the vulture, and another very large grey bird about 2 feet 6 inches high, having a large beak some 8 inches long. These latter birds are very tame, and easily caught by the natives. They, however, never kill them, recognising their value for clearing off all carrion and offensive matter.

I had hoped to be able to go on to more villages further inland, but the delay at Dangi's and the covetousness of the Masai had so diminished my cloth that I was obliged to retrace my steps at once. The Masai were very kind in their manner to me wherever I met them, but I could see that under all their kind manner they were eager to get what they could from me, thus making good the words of Saja that their "Shore, shore," was for what they could get. After all the cattle were out, the chiefs of the village came together, and we had talk till nearly 9 A.M., in which I told them my object in travelling about. At the end of the speech-making one old man stood up, club in hand, and declared that the Olozungu's words were good. "He was going away at once; they would be glad if he would stay longer with them. If he must go now, let him return quickly to us; let him bring cloth and beads for our wives and children, and let him stay with us as long as he pleases. All the country is his; he may build his house where he pleases." After the old man's speech was over and translated to me, I thanked him and all for their kind words, and told them that if I did not come myself, in due time some other European would come and see them, and probably live with them. At this they professed themselves well pleased.

At about 10 o'clock we started to return to Dangi's village, in company with six Masai, who were going with us to get a small present which they considered to be their right. There was some dispute between my guide and the Masai about the presents. I need not enter into particulars, but will only remark that much care is needed in dealing with these people,

and that it is very necessary to understand their language, for both the Swahili and the other natives are to be little trusted, even in the smallest matters.

Early on Monday morning, after a few farewell words with Dangi and Saja, I set out on my return home to Mamboia. Saja's last words were "Ncimorra Engai," implying, "I shall pray for you till your return." We travelled by a more southerly road, and entered the Luvumo valley; then passing by the south side of Sagasa Hill, and over the Luhiga, we followed the course of the Luseru as far as Kiseru. We stayed to rest at the village we had slept in when we were on our way to the Masai. Here we killed a goat Saja had given us, and had some food. After a good rest we started again, and following the course of the Luseru and Bóroma, reached Kibanti Kwa Kigolo at 3.15.

This is, in my opinion, the most suitable place for a mission station north of and within an easy distance of the Saadani road. There is a river of good water always running, good sites of land, plenty of people living in large villages, and apparently the chief and his people would be glad to have a European living with them. From observations of north and south stars, I found the latitude to be 5° 54′ 26″.

We started from Kibanti at 5.45 A.M., and reached the Mleñga stones at 8 A.M. There we entered the road by which we had come. Thence we went on to Maguo, which we reached at 9.45. Here we rested a short time, had some talk with some of the natives, and then went on to Chaguwari. Here a new village has lately been built. The inhabitants are Wa-nguru and Wa-asi. These Wa-asi are a tribe closely allied to the Wa-humba, whose language they speak, but amongst themselves they speak Ki-asi. Dr. Krapf speaks of the same tribe in his book 'Travels in East Africa.' As he says, they get their living by hunting, and have but very few cattle of their own. Their manner of dress and general appearance is that of the Wa-humba; many people, indeed, call them Wa-humba. We rested in their village for about an hour. The people were very civil, and lent my men cooking pots, &c., as they wanted. They were good enough, however, to steal my cap, which I had laid aside for a moment and did not remember again till we were a good way on the road. We started from Chaguwari at 1.15, and reached Mahedu at 5.45.

The next morning we were up and started at 4 A.M., and reached Mwandi at 7.45. Here we rested fifteen minutes, and went on to Berega; rested half an hour, and then went on to Mamboia, which we reached at 12 o'clock.

Notes on the Masai People, their Customs, &c.

The Masai people are a race differing in several respects from the ordinary East African tribes. Probably the extent of country occupied by them is larger than that occupied by any other East Central African

tribe. Their most southern limit is about 5° 30′ S., long. 37° 15′ E. It is said that they extend northerly almost to Uganda, and that Suna, the father of Mtesa, the present king of Uganda, frequently sent his soldiers to fight them. Judging from what I saw of them, I think they may be a little above the average height of the ordinary negroes, but they are not such a fine tall race as I was led to expect. I saw some three or four men who were about 6 feet high. The majority were of average height, though there were several who would be considered very short. Taken collectively, there was but little difference between the height of the men and women. Some of the latter looked very fine, both for height and build.

The features of the Masai are of two kinds. First, the pure Masai. There is a striking contrast between these and the common negro. The forehead is high, nose long and straight, lips thin, and the head itself long and narrow when compared with the negro's round skull. Some few of the young men are of a lithe and supple build, and apparently could run with great swiftness ; but most of the people are stouter, more fleshy than common natives. All the women may be taken as finer specimens of humanity than ordinary negro women. The second kind of features is a mixture of the pure Masai and the negro. This is caused probably by the intermarriages of the Masai with the women of the surrounding tribes, and also with the Nyamwezi and Gogo slave women whom they buy.

The colour of the Masai is generally very dark, almost black, though occasionally one may be found of a lighter complexion. Those of a light colour are probably the offspring of a Masai father and Nyamwezi mother, some of whom are much lighter in complexion than other tribes.

Their hair is crisp and curly. The women do not seem to dress their hair much. The men, however, are great dandies. Because they cannot get their hair to grow long enough, they take the inner bark of a small shrub, split it up finely and dry it in the sun, then cutting it in lengths about 18 inches long, they weave it into their own natural hair, so making it apparently nearly two feet long. The whole mass is then well saturated with a mixture of fat and clay, collected together and carefully bound into a kind of pigtail. Generally only one of these pigtails is worn behind, but sometimes they wear one behind and one before the head.

The clothing worn by the Masai men is very scanty. Ordinary cloth, which they call *engobito* (in the Humba language, *enanga*), is but little used by them, it being very scarce, there being so few traders who pass that way. The engobito is worn only by the chiefs, and the young men when on the war path. They do not wear it to cover themselves, but simply fasten one end round the neck and let it flow out behind them. The dress generally worn by the men ranging from fifteen to forty years of age is the *olmagiti*. This is a square, made of a large goatskin, but more often

from a young bullock's hide. The two upper corners are joined by a thong, it is then thrown over the head and shoulders, and when on, just covers one side and half the body. In addition to this they wear the *olding'ori*, a heart-shaped piece of skin which is fastened round the loins, and falls behind. This is used more as a seat than for a covering. The male children do not wear anything, perhaps in a few instances they may have a small olmagiti. Old men sometimes wear clothing similar to women. The women are very closely dressed and ornamented. Their dress consists of two large pieces or squares, formed by sewing pieces of skin together. These are called *olgira*. One of these reaches from above the waist to the feet; the other passes over the shoulders and reaches nearly to the feet. They are held together at the waist by a copper, brass, or iron zone, or by a leathern girdle. All the Masai women, and even all the female children, are well dressed, so that only their hands, feet, and faces are to be seen. The men are apparently very particular about the dress of their women, but have not the slightest regard to decency amongst themselves. When the Masai came to see me at Dangi's in a state of almost perfect nudity, I thought that perhaps it was their travelling custom, and that in their villages they were more particular; but when with them in their homes I found they were less particular, for males of all ages, from infants to old age, went perfectly naked. In that state they walked and talked with the women who were out milking, amongst whom there did not appear to be the least shame at the unseemly custom.

Ornaments are profusely worn by the women, but the men seldom adorn themselves beyond dressing their hair in the manner above described, and wearing a small bracelet made of iron wire and beads threaded together. But few men wear the bracelet. The women encase their legs in iron wire about a quarter of an inch thick, in coils from the ankles nearly to the knees, and their arms from the wrists to the elbows in the same metal. Sometimes copper and brass are used, but iron seems to be preferred. On the neck there is a large collar of metal wire; this is often four inches wide. Zones of brass or copper wire are worn, two from each ear, besides a number of other indescribable ornaments of beads and wire. From the neck, again, a crescent of wire or iron is worn, from which is suspended iron chains and beads. This completely covers the chest. When a woman is fully dressed and ornamented, she looks quite picturesque.

The chief work of the women is to assist in building and herding cattle, and to milk the cows night and morning. They also watch the cattle at night together with the men. The old men and women and very small children remain at home, the elder boys herd the cattle, and the young men and those to about forty years of age watch over the cattle by day and village by night, a few of them occasionally going on a raid to villages of the negro tribes.

The weapons used by the Masai are spears (*ombéri*), shields (*elong'o*), swords (*óllalem*), clubs (*ologuma*), bow and arrows (*oluïándai*, *orseïïet*, *ombaia*), knives (*ossírere*). The Masai cut their own wooden clubs, but they are dependent on the surrounding tribes for all their iron instruments and weapons. There is no iron in the country, nor do the Masai know how to work it. I have been told that formerly the Masai used wooden swords and spears made from hard wood, but when they came to U-gogo they laid aside their wooden arms and took those of the Wa-gogo. The Masai shield is made of ox-skin, of oval shape, about 4 feet 6 inches long and 2 feet wide in middle. The blade of the spear, which is always kept very bright, is generally 18 inches long and 5 or 6 inches at the widest part. The clubs are generally made from the roots of hard trees. The Masai are dependent on the surrounding natives not only for their weapons, but also for the working up of the metal ornaments of the women.

The domesticated animals of the Masai are oxen, sheep, goats and a few dogs; they have neither cats nor fowls. There are a few donkeys of a poor kind, yellowish grey in colour. Oxen constitute the chief riches of the Masai. These they have in great numbers. In the village where I stayed there were probably 2500 or nearly 3000. Other villages are said to have much larger herds. These all have humps like the coast cattle, though I heard of some further inland which are said to have very long horns and no hump. Some of these cattle have horns 2 feet long. They are generally finer and fatter than the coast cattle, but not so large as English oxen. The sheep and goats are of a common kind.

The kind of cloth in greatest demand by the Masai is good white "mericani." They are much pleased with squares containing four yards; that is, two pieces of two yards long sewn together and making a square. They are also fond of red cloths, which they like to wear in time of war; small blue, pink, and red beads are also much admired by them, but none so much as a large red bead with white centre.

There are various causes which lead the Masai to fight amongst themselves, as, for instance, the stealing of each other's cattle; or should a number of young men go out on the war path without the consent of the chief, when they return those remaining in the village will turn out and fight them. This law is followed so as to counteract the formation of parties or divisions in the settlement. When it is proposed to make war or a raid on any place, the medicine man is called, who goes to sleep in the medicine house. Should he awake in the morning with milk in his hands, the expedition will be successful and profitable, but should there be blood instead, then death and disaster is indicated.

The Masai have some notion of God—"Engai"—as the source of good, and "Essatan," the source of evil. Frequent sacrifices are made to Engai in time of sickness, war, and dearth. They say, "Embotisho olbēijani nenguragi Engai"—"Call the chiefs that we may worship (or

entreat) God." They sacrifice on the hills, but the Masai themselves do not eat of the flesh so sacrificed, but hand it over to the Wandurobo (Olumuri), who are in servitude to the Masai.

At the time when a person has died, the Masai do not wash the body, but take and place it at the foot of a tree. They then cover it with grass, place a *buyu* of milk at the head and foot, and cover all with an ox-skin. Then an ox is killed and placed alongside the body. A prayer is offered—"Totona siddāi, etung'aigi tangera"—"Sleep well, may the children you have left behind fare well."

When a person dies in the settlement, an act of purification has to be performed. An ox is killed; the dung in the large bowel is mixed in a large pot with water; then a bunch of grass is taken, and the house inside and out sprinkled with it. What is to spare is emptied outside the village. When the body has been laid, the bearers go and bathe in the river. Grown-up men and women are placed under trees, but little children are buried outside near the village. No purification is made for a child. An ox is always given to the bearers.

The rules connected with marriage are very similar to those of other African tribes. A man having seen the woman of his choice, sends his sister or some other competent person to the father to talk over the price to be paid. This varies according to the status of the man and the woman who is sought in marriage. If the daughter of a chief is sought by a chief or son of a chief, then the intending bridegroom must pay forty oxen, forty goats, and twenty sheep; but if all the parties concerned are poor, then the man pays four oxen, five goats, and three sheep. When paid, the man takes the woman to his home. The father of the husband gives an ox to the wife for a feast, and the father of the wife gives an ox to the husband for the same purpose. Also the wife's father gives his daughter five cows with calves, as a present, and a stock from which to rear up a herd of cattle. These gifts vary according to the wealth of the parents of the parties contracting the marriage. No prayers or ceremonies are performed at the time of marriage; it is apparently simply a matter of buying and selling, though probably they would not adopt such terms to express the affair. When the woman has conceived, the man goes and seeks for a large pot of honey, which he brings home, and stirs up, mixing it with other things till it is quite thin; then he calls the chiefs. When they are come, the man and his wife sit down, the chiefs take a portion of the honey and spit it over them, offering a prayer for their prosperity and that of the child which is likely to be born. This done, all have their speech to make. Then the honey which remains is drunk, making a kind of feast very similar to the pombe-drinking of the negro tribes. If the woman turns out badly, even after she has borne three or four children, the husband sends her back to her father, keeps the children, and demands from her father what cattle he formerly paid for her. If the man does wrong and wishes

to put away his wife, he will send her back to her father and not demand the cattle he had paid for her if she has borne children, but if she has been barren he will demand the cattle he paid at marriage.

If a man very frequently beats his wife, she can return to her father and request him to return the cattle to her husband which he had received from him, which done, she leaves her husband, and is at liberty to marry again, only her former husband cannot take her.

A man is allowed to have as many wives as he can get. Generally a poor man has two. Limba, a chief who lives near Bokwa, has, it is said, 200; but I think this is not quite correct. Though polygamy is allowed, I could not hear of any instance of polyandry.

If a man kills his fellow in secret, when discovered he is killed by spear and sword. If by accident a man is killed, the person who causes his death has to pay the price of blood. If two men call out each other in open fight, the conqueror has to pay according to the status of his opponent whom he has killed. Children of chiefs play with swords, but the common people with sticks.

If a man is caught with another man's wife, he is killed. If the husband of the woman finds the adulterer outside his house he is made to pay. If a woman is enticed to another man's house and caught, both man and woman are killed.

The Masai chiefs have not absolute rule over their people, though probably their power is greater than that of the chiefs of the negro tribes. Chiefs are able to send their people to war, to build fences and houses, and to herd cattle, but they cannot sell them. The chiefs judge all cases and take a portion of the fines. If the plaintiff is poor the chief takes only a small part, but if he is rich he takes a larger share. A chief also has power to refuse his people to go here or there.

The manner of building used by the Masai is quite distinct from that of any of the other East African tribes. First, they select a spot, not on the tops of the mountains, but on the tops of the hills projecting from the sides of the mountains. They first enclose a very large square with a single row of houses (*ossuti*). The village when finished is called *engaji*. The houses are thus built. First, strong withes or sticks which will bend are cut; one end is inserted into the ground, the other end is then bent down till it reaches the ground, and forms an arch about 4 feet 6 inches high. Some dozen or more of these are fixed in the ground so as to cover a space 6 feet by 9. These are then interlaced together by other smaller twigs and covered with grass. Then all are covered with ox-hides, and these in their turn are covered with some three or four coatings of ox-dung till quite waterproof. A small door about 1 foot wide by 2 feet 6 inches high is generally left in the side of the house. Some of the houses are a circle of 6 feet in diameter and 4 feet 6 inches high. The largest will be the same height, but 20 feet

long and 6 feet wide. When this outside ring of houses is built, a few here and there are scattered in the square, and each man's division of the square is marked off. Then a strong fence of bushes and prickly thorns is set up all round, leaving here and there a gateway by which people and cattle enter, and which are closed at night.

The native negro tribes do much work for the Masai, who consider it a disgrace to labour; but the Masai can work when there is no one else to do it for them.

Phrases and Words in the Masai Language.*

Bring water	Autu engarre.
I want flesh	Reiyau engirre.
Bring hen's-eggs	Iyau olong'orúshia el olmotónyi.
Bring a fowl	Iyau engugushégi, *or* olmotonyi.
Bring milk	Iyau kulle.
Bring an ox that I may kill and eat it	Iyau engitengi netáremu nenósa.
Bring a large sheep, with a large tail	Iyau ologerre kitok, nata kidong'or kitok.
Bring a large goat	Iyau ologinne kitok.
Bring a kid	Iyau ologúo.
Bring fire	Iyau engimma.
Bring much firewood	Iyau ologuye gumu.
Bring much grass	Iyau ombenéju gumu.
Call the chief	Embotisho olbēijani.
Call that man, that he may come here	Embotisho oldung'ana olēijing'a wáü teni.
Call the two men to come here	Embotisho oldung'ana bogi warre wáü teni.
Call the woman	Embotisho etágitoki.
Call the child	Embotisho olēijoni.
Where is my man?	Agodi oldung'ana wa nanu?
Where is my man?	Agodi oldung'ana al'nno?
Where are all my men?	Agodi oldung'ana el'ino bogi?
Where is my ox?	Agodi engiteng olalēi'?
Where is water, that I may drink?	Agodi engarre neogo?
Where is good water?	Agodi engarre siddai?
Where is the village?	Agodi engaji?
Where is the chief's house?	Agodi assuti el olbēijani?
Where is my friend's house?	Agodi essuti el esshore el'ino?
Where is my house?	Agodi essuti el'ino?
Where is my friend?	Agodi esshore el'ino?
Where are all my friends?	Agodi esshore el'ino bogi?
Fetch water that I may drink	Ntāïigu engarre naogo?
Where have you come from?	Aito, aijea ng'wa?
Where are you going?	Aito, aijea homo?
When will the chief come?	Olbēijani ollutwánu?
Are the men coming?	Eúo oldung'ana?
What do you want?	Enyōī eyēū'?
I do not understand, say it again	Meta nwama, érïmu meningíshu.
I shall not buy it, it is too dear	Menyang'o, eïgúru.
I have lost my road	Emina eng'ōīto.
Show me the road to the chief's house	Neutagi eta eng'ōīto, neibagi eta olbēijani.
Do not make so much noise	Igïra, tebala merodi.

* In writing these Masai words, I have followed as near as possible Bishop Steere's system of spelling.

Take this cloth to the chief	Njea engobito eisho olbēījani.
Leave that alone	Ebari endogī.
When shall I come?	Nanu olutwanu?
Is the chief in good health?	Siddai el olbēījani?
I want you to come with me	Uiteni nerubari.
Go and stop that noise	Kweta irodi olēījing'a, nēigira.
Go away, I do not know you	Erínyo, loiye meyollo.
Go and call the chief	Mabi, mbotisho olbēījani.
The chief is here	Olbēījani eï'ta.
The chief is away	Erimana embarāī olbēījani.
How are all your people?	Fangera bogi siddai?
To-day I shall come and see your village ..	Nanu neilotu tangaji waiye dúo.
I want to sleep	Neiyou neirura.
I want to eat	Neiyou nenosa.
Let me see it	Teisho etadwa.
I cannot come to-day	Nanu meidimi neilotu dúo.
I will come to-morrow	Nanu neilotu nakényŭa.
To-day I am unwell	Nanu eseja dúo.
To-morrow I shall see the chief	Nanu neitádŭa el olbēījani nakényŭa.
Let the chief come now	Nje elotu el olbēījani tata.
I will see the chief now	Kitikata etadua el olbēījani.
Sit down	Totona taengopo.
Tell your people to come near	Érimu olēījing'a nago nelotu.
What is the name of that hill?	Nyo engárina nyona oldōīnya?
What is the name of that man?	Nyo engárina nyona oldung'ana?
What is this?	Nyo enna?
Who is this man?	Ng'āī oldung'ana enna?
What does he say?	Ejo nyo?
What does he do?	Endabirá nyo?
I am not doing anything	Maendabira endógi.
I am here	Nanu eti taïni.
Is he there?	Neito eti?
The man is here	Oldung'ana eïti.
The fire is here	Engimma eïti.
Let me go	Nanu nallo.
That man went	Idīa ashomo.
I am well	Nanu siddai.
Are you well?	Toiye siddai?

1 .. nabo.	2 .. warre.	3 .. unguni.	4 .. otoni.
5 .. imiél.	6 .. elle.	7 .. nabeshana.	8 .. lēisie.
9 .. ilsal.	10 .. tomon.		

Arm .. .. .. engūna	Ear .. .. .. éngiok
Armpit .. .. etamata tangi hogi	Eye .. .. .. ong'ong
Back .. .. .. engodiong'i	Face .. .. .. eng'omomo
Beard .. .. olmabitta	Fat .. .. .. olata
Bile .. .. .. elleseja	Finger .. .. olkimogino
Blood .. .. essaruge	Fist .. .. .. elabunga
Body .. .. osseseni	Flesh .. .. engirri
Boil .. .. olmok	Foot .. .. .. engeju
Bone .. .. olloito	Hand .. .. engēina
Brain .. .. ellogung'o	Hand (palm) .. endap
Breast .. .. elgina	Head .. .. .. ologunya
Breath .. .. olong'otoko	Heart .. .. oldau
Buttock .. .. orkóromo	Knee .. .. .. olong'ong'o

Left hand	engeina olgírian
Leg	olgeju
Lip	engutuk
Liver	olmonyŭa
Loin	olong'ōīti
Mouth	engutuk
Nails	ollelé
Navel	essurórŭa
Neck	olmorútu
Nose	óng'omé
Nostrils	ongutuk olong'omé
Rib	ollaláshya
Right hand	engina ollolewa
Scar	olong'oronyo el olmok
Shoulder	oldap
Spittle	engámŭra
Sweat	engarre olong'oro
Tears	eshiri
Thigh	ormoro
Tongue	olgejembe
Toe	elkimogino
Tooth	olata
Ashes	ossorondo
Bag	endutwa
Bedstead	ongoni
Chair	ololiga
Cooking-pot	olmoti
Door	olkishomi
Dust	ongurugu
Fire	engimma
Firewood	enguég
Handle	ongujuko
House	ossuti
Iron	ossiāī'
Knife	ollalem
Needle	olsoni, oltitu
Razor	olmorúnyu
Ring	ornorín
Roof	engeberi
Rope	ongibitó
Sheath	ongeshur
Spoon	ongira
Stick (for walking)	ossebwa
Stone	ossoit
Strap	ongene
Waterpot	olmoti
Well	olsirijú el engarre
Baby	olung'ara butu
Batchelor	oling'ding'óri
Beggar	olsumbwi
Boy	olaju
Brother	olalálāī
Brother-in-law	olabitani
Child (boy)	olung'ara-gutu
Dwarf	liard
Father	menye
Foreigner	olomoni
Friend	shore
Girl	endogi
Glutton	ollúria
God	Engai
Grandchild	aguíya
Guide	lologonya engōito
Heir	olugarushi
Herdsman	ollēīyúni
Huntsman	olongorori
Husband	olēīmeg
Judge	ollewa
King	olbēījani
Liar	elebéléb
Man	oldung'ana
Medicine man	olēīboni
Mother	yeīyo, used by females; elagitok, used by males
Slave	ossinga
Soldier	olmorana elding'ori
Son	láiyu
Thief	ebúruru
Trader	enyenisho
Vagabond	osóngero
Wife	elambiti
Wizard	oldung'ana ata eldogéta.
Witchcraft	esatan
Woman	endangile
Virgin	eshángigi
Old woman	gogo
Old man	olmórua
Neighbour	olaláhi
Porter (worker)	ossingāī'
Rich man	olobenyi
Sister	onganahi
Antelope	eshangito
Ants	olkimamani (siafu)
Ass	ossírigo
Bee	oletoro
Bird	olmotonyi
Buffalo	olsobwani
Bug	ong'ong'o
Bull	olengiténg ollewa
Bullock	engiténg
Civet cat	olshangito
Cock	olmotonyi ollolewa
Cow	emong'o
Calf	olahe
Dog	ollúria
Elephant	oldome
Egg	olong'orúshia el olmotonyi

Fly .. .. .. olusōī'
Fire-fly .. .. owōité
Frog .. .. .. olmoríyu el engarre
Gazelle .. .. eshangi
Giraffe .. .. olmōū'ti
Wild goat .. ossobeni
„ rabbit .. ossijinjuru
„ hare .. olkitoju
Hen .. .. .. olmotonyi
Hippo .. .. omonya el engarre
Hide .. .. olinjoni
Honey .. .. olmeji
Horn .. .. .. ossegegwa
Hump .. .. ongório
Hyena .. .. olnyatónyi
Insect .. .. olkimamani
Ivory .. .. ossegegwa el oldome
Leopard .. .. ologwaro
Lion .. .. .. olnyatonyi
Lizard .. .. olong'oróso
Milk .. .. gulle *or* kulle
Millipede .. oletu
Monkey .. .. olboroshi
Mosquito .. .. endorób
Ostrich .. .. engobiro
Oxen .. .. engīteng
Pig .. .. .. olubitíri
Pofu .. .. .. ossírŭa
Rat .. .. .. endero
Rhinoceros .. omonyi
Scorpion .. .. oleónyi
Snake .. .. olēīrura
Sheep .. .. olgerre
Tail .. .. .. ossabúri
Tongue .. .. olkijembe
Wax .. .. .. olēīliga elēītoni
Zebra .. .. ossigíria

Adze .. .. ondoro
Anklets .. .. osseng'engi el engeju
Arrow .. .. ombaya
Axe .. .. .. ondoro
Beads .. .. ossirimī omsitani
„ Black .. olēītwe
„ Red .. olologo
„ White .. olēībugenya
„ Blue .. omsitani
Bow .. .. .. omborogwaru
Bracelet .. .. onnorín
Cloth .. .. engobíto
Club .. .. .. ologuma
Drum .. .. ossingódio
Gun .. .. .. ondioru
Gunpowder .. omuséri
Hoe .. .. .. enjerembe
Knife .. .. ollalem
Pipe .. .. .. elmoti
Quiver .. .. omóbia
Sandals .. .. enyamuga
Sheath .. .. ongashuru
Shield .. .. elong'o
Spear .. .. omberi
Sword .. .. ollalém

Bananas .. .. olmagundu
Bark (for rope) engobitu
Beer .. .. .. olmaho
Caffre corn .. ologugu
Cassava .. .. olmarímgu
Flour .. .. ondabani
Grass .. .. ombéneju
Indian corn .. olbāīég
Porridge .. .. endaba
Pumpkins .. olmongōī
Pepper .. .. ossógonōī
Roots .. .. olong'asasa
Sugar-cane .. olmasonja
Sweet potatoes olmarungu
Thorns .. .. olokikwa
Tree .. .. .. enjata
Tobacco .. .. olgumbáŭ

Brook .. .. olgeju kiti
Cave .. .. .. ongabuni
Clay (red) .. ongorogo
Clouds .. .. olúmbe
Cold .. .. .. olkinjabi
Country .. .. ologwa
Darkness .. .. ongiwaríri
Dew .. .. .. ol engarre el engai
Fog .. .. .. olúmbe
Hail .. .. .. ongai ol esōī't
Heaven .. .. engeberi elēīso
Hell .. .. .. olúbángi
Island .. .. abori
Lake .. .. engabute
Light .. .. egwara
Lightning .. olémore
Moon .. .. olaba
Mud .. .. .. ongurugu el engai
Pit .. .. .. olkirengi
Place .. .. engweji
Rain .. .. .. engai
River .. .. elugeju
Rock .. .. osōīt kitok
Sand .. .. ong'orogo
Shadow .. .. olsesa
Star .. .. .. olkeri
Stone .. .. osōīt
Sun .. .. .. ong'orong
Thunder .. .. eshiriengai

Valley	olung'oseru
Water	engarre
Wind	olkinjabi
Wilderness	olung'oseru

All	bogi
Bad	torono
Bitter	edūwa
Black	elōi'twe
Broad	ebíre, elala
Cold	engejabi
Deaf	mata engiá
Drunken	eseja
Dry	egol
False	elejileji
Female	elagītók
Fierce	ebi
Good	siddai
Great	kitok
Hard	egugóng'
Hasty	eng'orang'ora
Healthy	siddai
Heavy	erusha
Little	kiti
Long	eleádu
Male	ollewa
Many	gumo
Narrow	esserité
New	ele tata
Old	egōi
Open	mata egwajena
Quarrelsome	ata engasu
Red	elelogo

Rich man	oldung'anaata engiténg gumo
Rotten	enana
Shallow	kiti
Sick	emwe
Strange	olēimoni
Sweet	ossidāi'
Strong	olēing'oni
White	eibor

I am able	neiyollo
I abuse	netamuru
I accompany	nēirubari
I ache	naitadanya
I act	nandabira
I add	neitobona
I agree	neiyore
I ask	neitabara
I attack	neitoroto
I awake	neinyutoto
I barter	nenyangisho
I bathe	neibigi engarre
I beat	neari
I beg	neimonu
I bite	naonyi
I break	neibugusa
I bring	neiyāū
I build	nendabira
I call	naimbotisho
I cheat	naitariga
I die	naetwa
I divide	neing'are
I eat	nenosa
I receive	naisagi

In introducing the subject of the evening, the CHAIRMAN (General Rigby) said that the paper to be read was upon a part of Africa that had never before been visited or described by any European. The subject was of special interest to the Society because the expedition under Mr. Thomson would pass through a portion of the country inhabited by the same race, the Masai.

After the paper—

Dr. BAXTER said, having resided as a medical missionary for nearly six years in East Central Africa, and during that time had the pleasure of visiting his neighbours the Masai, he had been asked to supplement, as far as he could, the paper by Mr. Last. After spending a very happy Christmas (1882) with Mr. and Mrs. Cole at Kisokwe, he started on the following Wednesday with about eighteen porters to Sagala, a village about 12 miles off on the northern side of the Kiboriani Hills. Here he engaged two or three additional porters to convey grain for the caravan, and also a guide to conduct the party to Nzogi, a distance of about 30 miles. They reached there the next day and made friends with the chief, named Kihamba. This was accomplished by clearly explaining the object of his visit, and giving a present of a few cloths; he then sent for the headmen of some of the Masai families living near, to whom he explained why he (Dr. Baxter) had come among them. Being naturally suspicious of strangers, never having

seen a white man before, they thought he might be the harbinger of evil by bringing war, pestilence, or famine among them. It was with some difficulty that he could persuade them that he was not an *engai* or god, but only a man like themselves; at the same time he tried to make them understand that he was God's servant or slave, "Essinga la Ngai," and he was glad to say that they now know him by this name. He gave them some presents of cloth, tobacco, and knives, with which they were greatly pleased; they then escorted him to their homes. To the heads of each family and their young warriors it was necessary to give presents, but fortunately they were not expensive ones. The elders received a piece of stout white sheeting, two yards square, together with a knife and some tobacco. No doubt they would have preferred good coloured cloths, which, however, would have been twice as costly. The young men and warriors were delighted with *malamba*, which consisted of a yard and a half of red cloth or bunting, with about six inches of white sheeting sewn on each side, and a strip of about one foot deep at one end. The article of diet which the Masai prefer to all others is curdled milk; when they can get plenty of this they will not touch any other. They are most careful to keep their milk calabashes clean by scouring them with live charcoal. They only eat meat when they cannot get enough milk, which is the case in the dry season. When the young men are on a raid they take with them a number of oxen as food for the journey both going and returning. They never cultivate the ground nor eat fruit, though he found that some of the old women who had lost their teeth, and who probably in their younger days had belonged to other tribes, were very glad of porridge, and mothers even begged some for their daughters who were sick. The Masai are fond of some barks which they either chew or boil with their meat, and he (Dr. Baxter) had little doubt that some of them will be found to possess valuable therapeutic properties. Having made friends with the Masai he found them most kind and hospitable, and very anxious that he should dwell among them and teach them. The elders seemed most interested in the message that he brought them, but the young men appeared more anxious to know where they could go and capture plenty of oxen, to replenish their herds which had been considerably reduced by disease and the butcher's knife. As regards the climate of this part of the country, he had no hesitation in saying that with suitable precautions against the sun, Europeans may enjoy as good health there as at home, since there is no malaria, for the country is 3000 feet above the sea, and there is half a gale of wind always blowing, and whilst for five months there are occasional showers, the remainder of the year is remarkably dry. The Masai bear deadly hatred towards their former friends and cousins the Wa-baragui (commonly called Wa-humba), as evinced by their anxiety to exterminate them. When questioned as to the cause of this animosity, they said the Wa-baragui when living with them used to steal their cattle until they could stand it no longer and so they drove them away.—The Masai are the only tribe he met with who use oxen as beasts of burden; when shifting their camp from one pasture to another they make their donkeys and oxen carry their belongings. Salt and saltpetre are used by them to mix with their snuff, but he is not aware that they ever use it as an article of food. After his return a party of the Masai on the war path met two of his men in charge of a donkey; they were about to kill the men and take the donkey, when learning to whom they belonged, they said "Essinga la Ngai! Sotwa sudai! Tawalla, tawalla!" which is "The slave of God! a dear friend! never mind, never mind!" and left the men and donkey to return to the mission station at Mpwapwa in safety. The Church Missionary Society have a good garden about six miles from Mpwapwa, in which every kind of European vegetables will grow all the year round, so that the country is not so bad as many suppose.—When in the Masai country he saw

lions, leopard, rhinoceros, giraffe, zebra, and many kinds of antelope. There were at that time few elephants in the part he visited, as the natives said the following month was the time for their migration from the west, and that then they might be seen in large herds roving leisurely over the plain. On his way to the Masai he crossed over a large surface of limestone rock, and a little beyond this the ground was thickly strewn with a variety of shells. Shortly after two lions, seeing the caravan, bounded away like racehorses across the plain and brushwood. On the return journey he shot some zebra and an antelope; and on reaching the Kiboriani Hills was told by the natives of Sagala that two lions had lately been visiting them every night, and had killed several of their oxen. Wishing to strengthen the friendship already existing, he said he would endeavour to rid them of their foe. Having pitched his tent under a tree, he ordered the meat of the animals shot the previous day to be placed inside, in order to attract the lions. Instead of the porters sleeping as usual around the tent, fearing a nocturnal visit from his majesty, they asked permission to spend the night in the native house. Hearing this, one little boy said he would not leave master alone. He (Dr. Baxter) arranged his bed on boxes placed in the centre of the tent, with the meat and open door to his right, the sleeping lad and closed door to his left. Placing his guns in readiness and commending himself to the keeping of his Heavenly Father, he was soon asleep between the blankets. About midnight he was awoke by a scratching noise outside the closed door. Seizing his shot-gun he passed through the open door and saw at a distance of ten or twelve feet an old lion looking sideways at him. He gave him at once a royal salute from one of the barrels, which was loaded with 21 buckshot. His majesty quickly disappeared in the darkness and he (Dr. Baxter) was again soon asleep between the blankets. The next morning the lion was found 50 yards distant, quite dead, the shot having entered just behind his left shoulder. Traces of the farewell visit of his consort were plainly visible in the soft earth. The chief gave him a fine goat as a present, and the people brought him flour and beans, because, as they said, he had killed their great enemy.

Archdeacon Farler said he had not travelled in the Masai country, but he had lived on its borders in U-sambara, the country through which the Zanzibar caravans made their annual progress to the Masai country, and by means of traders he had obtained a good deal of information about that region. As was well known, Mr. Thomson had been commissioned to try and penetrate to the snowy mountains of Kilimanjaro and Kenia, and thence across to the Victoria Nyanza. It was very desirable to have that route opened up, because from Pangani to the Victoria Nyanza was only 60 marches of about five hours each, whereas the ordinary route of the traders of the present day occupied three or four months. The Masai were reputed to be very fierce and wild, their hand against every man, and every man's hand against them. The Swahili traders gave them a very bad repute, but these traders often cheat the natives, and therefore there was probably another side to the story. In his own intercourse with the Masai he had found them a very peaceful people. A few stages from his own station there was a large Masai town, called Mkomazi, where the people bred cattle, goats, and sheep, and supplied them to passing caravans, seeming to live in perfect peace. On the other hand, only last Christmas a raid was made on the U-sambara country, and the Masai were driven back with great loss. Some time ago while passing through the wilderness he came across their track, and found that they had plundered and killed many of the people who lived there, for they had a theory that all the cattle in the world belonged to them, and they robbed and plundered all the towns in the coast district where cattle were kept. He was told by his *pagazi* that their custom was to make a new pair of

shoes every day, and he discovered old sandals thrown about on all sides. Native traders had informed him that it was quite possible for Mr. Thomson to reach Kilimanjaro and cross to the Nyanza, but there were two ways of doing it. One was to join a Swahili caravan and travel very slowly. Such a caravan, consisting of about 2000 persons, would take about twenty days to do what an ordinary caravan under an Englishman would do in five days, because at every large station the traders remained three or four days. Still he would strongly advise that any future explorer should join himself to a Swahili caravan in order to cross the Masai country. The other way was for a small, well-armed party to push rapidly through the country. The great chief of that country appeared to be a man named Mbaratiani. He was not a Masai, but from the country of U-gogo. About thirty years ago his father came into the Masai country and married one of the daughters of a Masai chief, and by great pretensions to witchcraft so impressed the people that they elected him to be their chief, and now his son had the most influence over the Masai people, so much so, that Dr. Baxter had said, that down in the Mamboia country his name was a power. Mbaratiani was not a cruel man, but open to reason. All the traders gave him the character of a very kind, sensible, good man, and if he received presents he was perfectly willing to give every possible assistance. It should be remembered that every petty chief required a present. The people over whom he immediately ruled were hardly Masai, but Wa-kwavi. They lived in a fertile country, and grew maize and sweet potatoes, with which they supplied passing caravans. Kisongo was practically the capital of the whole Masai country. If Mr. Thomson could only reach Mbaratiani and make friends with him he would not find very great difficulty in getting across the country, for there the Masai country narrowed, and eight or ten marches would take him to agricultural tribes who were perfectly peaceable and willing to receive traders. The routes already known were very varied and numerous, but the two he had the most knowledge of passed through a wide open tract of country perfectly level. One of his informants told him that from the entrance to the village of Narko they could look over an immense extent of country, as far as the eye could reach, with nothing but grass, and isolated hills 1000 feet high here and there. The air was cool and pleasant, the country perfectly wholesome and healthy, and the Masai bred enormous herds of cattle. In various parts there were wells dug by the Masai, and even in some parts reservoirs, made by the chiefs, where they collected the springs for watering the cattle. In the borders of the Masai country there was a tribe called Wandorobo, who seemed to live by the chase, and supplied enormous quantities of ivory to the traders. At Nata in Ngoroini, on the other side of the Masai country, the people were so urgent to trade that when the caravan left a town the women would rush after them with grain and vegetables, beseeching for purchasers, and would follow them for five or six hours' journey. The Swahili had told him that in that country there was no lack of food or water. From the Wa-kosobo tribes it was six or seven marches across the Kavirondo country to the Victoria Nyanza. If Mr. Thomson could succeed in passing through this country it would be a great honour to England, and he believed the Masai would be found to be very decent people.

Captain C. E. Foot, R.N., said Mr. Last had told him, when in 1879 he visited that gentleman at Mpwapwa, that he intended to encourage friendly relations with the Masai, and there could be no doubt that he had succeeded to a great extent. He was glad to hear that Dr. Baxter had been able to make a garden at Mpwapwa, and to grow fruits and vegetables, for when he (Captain Foot) was there, it seemed to be a very difficult thing to do. The Nguru Hills, about 80 miles from the coast, were just beyond the forest of Kidudwe, and the scenery there

was very grand. The French Mission Station at Mondo was situated about 1500 feet above the level of the sea, and cabbages and other vegetables as well as English fruits grew there. He also believed that coffee, and possibly cocoa, would flourish there, while in the valleys below, which were well watered, and where the soil was very rich, he saw the largest sugar-canes he had ever seen in any part of the world. In 1881 he had the pleasure and honour of a walk with Sir John Kirk from Dar-es-Salaam up Mr. Mackinnon's road, which is completed to a distance of about 73 or 75 miles. When they got to the end of the road they branched off and went towards the Mnagata Plains, and Sir John Kirk said most of the country traversed was the poorest part of Africa he had ever seen; and he (Captain Foot) believed that in time the Nguru Hills would become like the ghauts of India, the resort of Europeans and others from the lowlands. The Sultan of Zanzibar had done much towards opening up the route as far as Mamboia. In 1880 he sent General Mathews there with a portion of his army. A guard was formed at Mamboia which kept the marauding Wa-humba in check. He hoped that the Sultan would ultimately assist a railway company to push on to Lake Tanganyika. It was known that there was coal near that lake, and minerals on the road, and those were the things that would pay. Considerable progress in developing His Highness's possessions had been made of late, and all interested in Africa should be invited to aid such an enterprise.

Colonel Grant said that in his journey from Zanzibar to the Victoria Nyanza, and thence to Egypt, he heard that the Masai were a savage, barbarous race, but he believed they were not worse than other natives who had been driven into savagery by the traders from the coast who had gone there slave-hunting. Archdeacon Farler thought that the country could be passed through more easily by an English traveller if he joined a Swahili caravan or Arab traders, but he (Colonel Grant) would not recommend any such thing, for those traders were the men who destroyed the people and the country. An Englishman behaving like a gentleman, and showing kindness to the natives, would pass through much more safely if he did not join the rascally traders.

Mr. R. N. Cust said that Mr. Last was an excellent lay missionary who had been for several years at his station. At the present moment he was suffering under the heaviest domestic affliction. Two years ago he was married at Zanzibar by Bishop Steere, but at the beginning of this year his wife died from sunstroke. This was the last occasion for some time on which Sir John Kirk would be present at their meetings. All those connected with associations working in East Africa united in praise of the kindness shown to them by Sir John Kirk, who was a kind friend, an impartial public officer, and a judicious counsellor, and those interested in East Africa would be delighted to find him back in his old place again. All friends of humanity must be obliged to him for the noble resistance he had made to the slave trade. During the last ten years, since he was on the Zambesi with Livingstone, a great change had come over the country. There had been expeditions of every kind. From Mombasa to the Zambesi there were signs of progress. On the north, Mr. Thomson was fighting his way to the Victoria Nyanza. Then there were the stations of the Church Missionary Society and the Methodists, who would profit by the route Mr. Thomson was opening up. A little to the south there was Archdeacon Farler's residence at Shambála (U-sambara). Further south, Zanzibar was the headquarters of the Universities' Mission. Still further south there was another station, one of the members of which had forced his way to Lake Nyassa. The London Missionary Society had stations at U-rambo, at Ujiji, and on the other side of Tanganyika. Then there was the Belgian Association, started by that munificent patron of

exploration the King of the Belgians, working both on the east and the west coast to form a line of stations, purely secular, which might welcome the traveller right across Africa. Recently Lieutenant Wissmann, who started from Loanda, had walked across to Nyangwe, and thence to Zanzibar. There was also what was almost a Scotch colony on Lake Nyassa, Old Livingstonia and New Livingstonia. There was another station at Blantyre on the Shiré. The French Roman Catholics had stations at Bagamoyo and on Lake Tanganyika, but they had suddenly moved away from Victoria Nyanza. Still they intended to have a line of stations from the east to the west coast. It was much to be desired that they would give up their practice of purchasing slave boys and girls, with a view of founding orphanages, as it created a bad impression among the people and roused hostility on the part of the relations of the kidnapped children against Europeans in general.

Sir John Kirk said it had always been a pleasure to him to assist in geographical work and to push on civilisation in East Africa, but the terms that had been used with regard to what he had done were far too high, especially in the presence of his predecessor, General Rigby. If General Rigby had not freed the Indian slaves it would have been impossible to accomplish what had since been done. The Chairman did the rough work, and he (Sir John Kirk) had filled in what was lacking. Without General Rigby's work Zanzibar would not have become a commercial centre dominated over by British interests and British trade.

The Chairman, in proposing a vote of thanks to the author of the paper and the gentlemen who had taken part in the discussion, said that everybody present must have been struck with the extraordinary way in which East Africa was being opened up by missionaries and others to trade and civilisation. When he first went to Zanzibar, twenty-six years ago, nothing was known of the interior; the vast lakes were undiscovered; the names of the countries now talked of in a familiar manner were unknown, and the map was a complete blank. During the four years he was at Zanzibar he was the only Englishman there, but now he believed there were more than 100 English residents. The trade had vastly increased, the children were being educated, and civilisation and Christianity were spreading rapidly over the interior of the continent. It was a remarkable thing that at one Evening Meeting of the Society they should have present Colonel Grant, Sir John Kirk, Archdeacon Farler, Dr. Baxter, and Captain Foot, all men who had done their part in forwarding the civilisation of the country. With respect to the Masai, an instance occurred while he was at Zanzibar of the respect they showed to Europeans. The Masai came down and ravaged the Wa-nika country, just north of the port of Mombasa. There was a Church Missionary Station there, and Mr. Rebmann, hearing of the approach of a vast army, shut up his house and went to Zanzibar, where he remained two years. On returning to his station he found the house and property untouched; not a single thing belonging to him had been destroyed. He had never heard of any instance in which the Masai had been hostile to white men, unless they were Arabs whom they regarded as stealers of their children. They deserved the name of a nation, for they extended far inland. They seemed from their habits to belong to the great Galla race.

Mr. Thomson's Report on the Progress of the Society's Expedition to Victoria Nyanza.

The following is the detailed account of Mr. Thomson's proceedings which has reached us since the publication of his shorter letter to Colonel Miles, in the last number of the 'Proceedings.' In "Geographical Notes" of the present number, we publish a telegram received August 13th which announces the safe return of Thomson to his camp and his intended second attempt to penetrate the difficult region before him.

Mombasa, *June* 5th*, 1883.

Dear Sir,—My late telegram will have apprised you of the main facts relating to my appearance in the Masai country and subsequent retreat to Taveta. It now remains for me to enter into somewhat more satisfactory detail on these matters that you may clearly understand my present position. I have, however, just learned from Colonel S. B. Miles that letters sent from Taveta, containing an account of my proceedings so far, have not reached Zanzibar, and I am therefore under the necessity of commencing from Zanzibar and indicating to you how I reached Taveta.

From the time of my arrival at Zanzibar I was exceedingly anxious to learn what route Dr. Fischer proposed taking in order that I might avoid it as widely as possible, leaving him to pursue his explorations undisturbed. His agent, the German Consul, repeatedly informed both Colonel Miles and myself that his route was viâ Kenia to Baringo. It seemed, therefore, that I was left clear to follow my original route direct to Kavirondo, and I at once set about organising my caravan on that basis, more particularly selecting the goods required by the Masai and Wa-kavirondo of those regions. If I had had to proceed viâ U-kamba and Kenia the goods required would have been very different.

So much it is necessary to premise, in order to show that I had taken precautions to keep my route as far apart as possible from that of Dr. Fischer.

I left Zanzibar on the morning of the 6th March, on board the steam-tug *Suez* which had been kindly lent for our use by Captain Luxmoore of the *London*. Colonel S. B. Miles, in spite of the state of the weather and the uncomfortable character of the tug, kindly accompanied to give the weight of his presence to facilitate our departure from Mombasa. After a very rough passage we arrived at the latter place in the morning of the following day and found Martin with all the men safe encamped at Frere Town. Here we were hospitably entertained and every assistance given to us,—the Rev. W. E. Taylor deserves more especially to be mentioned.

On the 10th we moved up to near Jomvu and then to Rabai, where again I was treated with marked hospitality. It was not, however, till the 17th of March that I was able to make my final start. On that day we made a short afternoon march and camped at Kwalé.

The route selected is one which passes Taro and Maungu to Ndara, where there is now a Church Missionary Station. The description already given of this whole region by the numerous travellers who have passed through it, cannot be improved in the few lines of a letter, and I shall not attempt any at present. Suffice it to say that

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* Mr. Thomson dates his letter "July," but this is evidently a mistake: his letter to Colonel Miles was dated June 5th.

we suffered some hardships in the way of filthy water and marches in which none was to be got.

The Church Missionary Station was reached in seven days. It is situated on a spur or ledge of Ndara, a bit of which I ascended. We had here a little affray which might have ended in bloodshed. Another march brought us to the Matate, and a second to the western side of Bura, where we stayed two days. An attempt to ascend Kilima Kibomu failed, owing to the stupidity of our guide.

I should have mentioned that a night spent with Mr. Wray at Ndara resulted in the stoppage of the watch which carried Greenwich time by the forgetfulness of Martin, the sailor, into whose hands it had been placed with strict injunctions to wind it at the right time. At Bura we had again a "little affair" with the Wa-teita, which even went so far as firing guns. This also ended amicably, though the following night a conspiracy to cause a stampede of porters was fortunately discovered just in time. We had intended to start on a long march at midnight, and we were just on the point of starting when we discovered that there were several hundreds of Wa-teita in the bush, so we quickly returned and waited till daybreak.

On the 31st of March we reached Taveta, the last march being from 2 A.M. to 6 P.M.

The journey was in every respect successful, though three men had to be left on the way and three ran away. It brought out, however, very prominently the fact that I had got as "rotten" (to use a Swahili term) a lot of porters as ever left Zanzibar. The town, in fact, was simply denuded of good men, and we had to be content with whoever came up. We did not ask too many questions, and the consequence was we recruited the major part of the rascality of Zanzibar.

On my arrival at Taveta we found that we had got a work of unexpected magnitude before us—namely the putting together of nearly 50,000 strings of small beads, and the sewing of nearly 500 of the cloths worn by the Masai on going into a fight. This proved to be a more arduous task than I had anticipated, occupying us over twelve days, during which our light-fingered porters contrived to assist themselves to over three loads of beads in spite of the severest punishments.

I found also on my arrival, that Fischer was at Arusha-wa-Chini, and that he had no intention of proceeding to Kenia, but was, as I originally thought probable, going straight to Baringo, viâ Ngurumani. On consulting my headmen as to what we ought to do under the circumstances, it was made clear that we must proceed as we had commenced, our goods not being suitable for an *up* journey through U-kamba. Fortunately there was a choice of routes. On all hands it was stated that Fischer was going viâ Arusha-wa-Jun and Kisongo, we were therefore left open to proceed viâ Kiraragwa and Ndupduk, which was a shorter, though a vastly more dangerous and expensive route. I had no opportunity of opening communications with Fischer as he left for the Masai a day or two after my arrival at Taveta.

At this point in our course it was made clear that it was of very great importance that I should get a second guide and interpreter. One named Muhinna I got at Mombasa, through the good office of Mr. Wakefield. We were not long in finding a very efficient interpreter in the shape of no less a person than Sadi, the guide of Von der Decken and New. Although we found him living like a pauper he proved to be extremely difficult to deal with, and six days were consumed in slippery negotiations. At last, much to my relief, every preparation was complete, and though many Wa-Swahili shook their heads at our small caravan, accustomed as they were to caravans of 500 to 1000 men, yet I was full of hopeful expectations of getting through all right.

On the 19th of April we moved out of the forest of Taveta and commenced our

hazardous march. Our route lay round the base of Kilimanjaro, which daily swathed in clouds had as yet baffled all our attempts to view it in all its magnificence. It almost seemed as if we were destined to go round about it and see a little of it, as if non-existent. Our first camp was at the small stream Habali. Here we were alarmed by the appearance of a messenger from Mandara of Moschi with the astounding intelligence that over a thousand Masai were camped two days ahead of us and might be expected to pass next day or the day following, and if they came in contact with us, it would mean either a disastrous fight or the giving away of all our goods. But I was equally afraid of falling into the clutches of Mandara. However, as it seemed the lesser of two evils I adopted the latter course. Next day, with much circumspection, we went forward, with an advanced guard a long way ahead to give timely warning for retreating into the jungle. The men went beautifully, there not being a single straggler; if they grumbled, they did so unheard. We crossed the Kilema and the Huni, and finally camped between two small volcanic hills. The following day we moved up to near Moschi to wait the passing of the Masai. Anxious to see the celebrated chief Mandara I resolved to occupy the enforced stoppage by visiting him—with empty hands however. I was received in the most princely manner, and a hospitality was displayed such as I had not seen anywhere else. His appearance is striking, and for an African, princely. He is very tall, and has an extremely intelligent face, which answers to every mood of his mind, and I may say I was captivated. He never hinted at the question of presents. It seemed to be too great an honour of itself to be visited by a white man, and he was ready to offer every assistance. Taking advantage of this generous behaviour I started on the second day to ascend to a height of 10,000 or 12,000 feet up the mountain for the purpose of making a small collection of plants from that altitude. I had, however, "reckoned without mine host," for after a terrific pull of seven hours up the Chaga platform, I found myself only at a height of about 9000 feet, and as I had to return that same day I had to make a hasty collection and retreat precipitately to Moschi, where we found a splendid feast thoughtfully prepared for us by Mandara. We also learned the good news that the Masai camp had broken up, and that we might now proceed unmolested, and Mandara's face beamed upon us with all the radiance or blandness of the heathen Chinee. Two days later Mandara was the subject of our execrations—as we left our camp with the knowledge that we had been the victims of a clever ruse, and minus (1) my own double-barrel smooth-bore, (2) a government rifle and bayonet, (3) a service revolver, (4) an iron box of my own, (5) a suit of tweed clothes complete (would that he were condemned to wear the boots!), (6) a great deal of cloth, and minor articles.

The next two marches over broken country diversified by stretches of forest, more open grassy areas and miles of thorny shrubs. The whole country was covered with enormous erupted blocks, in fact agglomerates and tuffs are the only rocks to be seen in the river sections, though towards the south-eastern aspect streams of lava have found their way from the numerous parasitic cones which dot the lower margins of the Chaga platform. It seems very clear that no flow of any great volume has ever succeeded in passing beyond the base of the mountain from the main crater. The composition of the lavas varies exceedingly.

You are aware that Kilimanjaro consists of two chief summits, Kibo and Kimawenzi; the former and larger, which has been usually described as dome-shaped, is in reality a perfect crater, a feature well seen from different points. Kimawenzi on the other hand is a peak, pure and simple, but I have no doubt in my own mind that it was the original volcano; that, as so often happens, the pipe became blocked, and the imprisoned forces found vent to the west, forming a new volcano, which soon rivalled its neighbour in size. The crater around Kimawenzi has through the

ages been gradually denuded away, consisting as it did of loosely aggregated materials, and finally laid bare the plug of the volcano, which now stands forth as the most picturesque feature in the whole mountain. I have spoken of the platform of Chaga, by that I mean the broad irregular terrace which skirts the southern aspect of the mountain, rises from 4000 to 9000 feet in elevation, and extends north and south more than 10 miles. It is only the outer and lower margin of this terrace which is cultivated and forms Chaga proper. In my opinion it is almost entirely formed by the numerous parasitic or secondary cones, which would naturally break out along the base of the primary cone on its reaching the enormous height it has attained. On this subject I cannot, however, enlarge further, however congenial it may be. I may say that my feeling has been that of disappointment on viewing this stupendous volcano. The features are too even and monotonous. There are few rugged crags and overhanging precipices, serrated outlines, or fantastic peaks, while Chaga with all its extreme fertility does in no way enhance its appearance, taking away rather from the effect produced by a mountain of such magnitude. The view from the south-west looking over Machame, is perhaps the most picturesque and varied, as there only do you see the clear sweep of the mountain from top to bottom, while to the north the Shira flanking shoulder attracts the attention by its scaured sides, its black gloomy rocks and narrow gorges, with Machame smiling at its base. Turning to the east our eye wanders over Chaga, with its fertile shambas, with their colours varying according to the product cultivated.

But I must hurry on. After crossing the Weri-weri and another very large river, the Kikafo, we struck away towards the north, and after two marches reached Kibonoto, an important point on the Shira shoulder, where caravans collect as much food as they are able to carry for the Masai country, where as you are aware nothing but beef is to be had.'

The second day after our arrival a deputation from the Masai of Ngare-na-Erobi appeared with an invitation to proceed to their place. This is what is known as the door of the Masai, and we were pleased to hear that in passing the door there would be at least nothing to fear, but our pleasure was considerably dashed on finding that we had come upon the track of Fischer, he having taken the Kiraragwa route in preference to the Kisongo one, and still more, he had been fighting two days ahead of Kiraragwa and some people had been killed. It was represented to us, however, that they had held a grand meeting on hearing of the arrival of another white man, to consider the question of allowing him to pass or not. After a stormy debate, it was finally settled (we were told) that we might pass. The deputation remained with us that night to act as our guides.

On the 3rd of May we moved out of camp, and after a tramp of two hours we emerged from the undulating and woody country of Kibonoto, and before us lay the Masai country. The view was not of the character we had imagined it to be, namely, the somewhat sterile aspect of the U-gogo plains, where except in the far horizon, few hills, and those insignificant, are to be seen. On the contrary, a picturesque landscape met our sight to the left, and nearly due west lay the wonderful conical mountain Meru, with its secondary peak to give it some variety. To the right, and rising from our very feet, towered the Shira shoulder, with Kibo almost hidden behind it. From these two great pillars to the "door" or "gate" of the Masai swept round an apparently continuous and unbroken range of mountains of the most picturesque description, rising here and there into distinct masses which bore names long familiar to geographers. Bearing 334° from our point of view was Doengo Erok el Kaptei, an irregular shaped mountain, forming a long range and not conical. Ndapduk or Ntaptuk, comparable in size and appearance to Meru, bore 318° at a distance of about 20 miles. Then further to the

west could be descried at a great distance the mountains near the Guaso N'Ebor and towards Ngurumani, and sweeping round Gelei is to be observed bearing 293°. Inclosed within these mountains lies a great undulating reach of country, dotted over with small volcanic cones. In our immediate neighbourhood not a tree is to be seen except along the course of the Ngare-na-Erobi; but further to the north-west, in the plain of the Ngare-na-Nyuki, a dark green area indicated the presence of a forest. To complete this hastily-sketched picture imagine antelopes and zebras in hundreds, numerous rhinoceros and ostriches. Here and there strange moving black lines are to be seen which are not stationary. These are the enormous herds of the Masai, feeding gradually over the splendid grazing grounds. At two points smoke curling upwards indicates the position of the kraals of Lingobei and Mbaratien. These are simply formed of a circular fence of thorns, immediately inside of which are the dome-shaped huts of the occupants forming an inner circle. They are formed by bent sticks and an outer coating of dung. I observed none formed of boughs and skins. In height they are from four to five feet and little more than six feet in diameter. The whole of the central area of the kraal serves as an inclosure for the cattle at night.

It was near the kraal of Lingobei and in a corner where the Ngare-na-Erobi makes a sharp bend that we camped and formed our boma. We were soon surrounded by hundreds of Masai, all armed with their enormous spears and neatly shaped and painted shields, and in an hour I soon found that my original opinion about the necessity of having a large and very well armed force was only too true. Before night we disposed of ten loads of goods, principally iron wire as hongo, and the scene that ensued over the division of the spoil was not by any means encouraging. The hongo is not levied as in all other places by the chief but by the whole of the people; they are divided into so many parties, to each party so many coils of wire, strings of beads, and cloths are brought. These are not quietly distributed, but are thrown into their midst, and the whole party make a rush like wolves over their prey. If two men happen to lay hold of the same thing, the question of ownership is only settled by superior strength, but if equal usually the *cimé* or sword is resorted to. Two men thus got ugly flesh wounds in the division of the spoil. As another illustration of their readiness to draw their swords I may mention my own case, in which a Masai actually drew his cimé to settle matters with me, because getting tired of his extreme curiosity to see the whiteness of my leg, I pushed him away. On his drawing his cimé, I laughed and pretended I wanted to see it, and so the matter ended.

So far matters had gone fairly well, the worst hongo was over, the people at Ngare-na-Erobi were friendly, and we had every reason to hope that we should get through all right provided no untoward accident should happen, such as had happened with Fischer, though the question would obtrude itself—If they could murder some of Fischer's men with impunity what might they not do with us, with a third or fourth of the number?

Next day, however, matters began to wear a different aspect. All the El Nioran (the young unmarried fighting men) had disappeared, and only a few of the older men were to be seen about. We then learned that we were not after all to be allowed to pass scot-free. The whole of the Legoi tribe who inhabit the Ngare-na-Nyuki plains had risen to dispute our further progress. A white man had passed and fought with them, killing a favourite headman of the chief Mbaratiani (not Mbaratien), and, still worse, two women, an atrocity hitherto unheard of. They had accepted blood-money because he was too strong to be fought with, putting off their revenge till a small caravan should appear. Now one had come, and to make it all the better a European with it. They were resolved to take full advantage of the

opportunity. The young men of the whole surrounding country who were ready for a bit of fun flocked to join Mbaratiani. Fortunately the chiefs and old men of the Ngare-na-Erobi were against any such action, but then their power over the young men is but nominal, or nearly so. Spies were set to watch us, but we put on a bold face, and talked of starting such and such a day, and that if they would not let us pass we were ready to fight.

It was clear, however, that any such attempt would be pure madness. We could have easily fought them for one or even two days, but by the end of that time we should have found ourselves without gunpowder, owing to the reckless way in which the men fire away their ammunition. Then, again, though we might keep them at bay, we formed too small a force to be able to help ourselves to food, so starvation would follow. The question, therefore, was now only how we might retreat unseen to avoid a fight, as that would only make it more difficult to pass by any other route. On the evening of the 6th of May a blood-brother of my guide came secretly into camp and brought in the news that the people from Ngare-na-Nyuki were meditating an attack on the following day, and advised us to be ready. We informed him we were ready to meet them; nevertheless, as soon as he was gone we told the men—who so far had been kept in blissful ignorance of the whole matter—to get ready for a night march. Fortunately the night was dark, and rain came on, which probably had the effect of driving home any spies there might have been about. Making up our camp fires anew so as to burn for some time, we set off on our somewhat hazardous retreat, passing quite close to the kraal of Lingobei. If a dog had barked, or one of our donkeys brayed, we should probably have been discovered, but no such event happened, and after travelling all night we safely reached Kibonoto. We had just got into camp when a tremendous rain came on which lasted nearly the whole of the 7th, and probably prevented pursuit, as the Masai are not fond of exposing themselves.

I have already in my telegram given you the latitude and longitude of our camp at Ngare-na-Erobi. I may add that George's barometer showed 25·67 in. Thermometer 68° at 7 A.M., while the B.P.T. No. 83306 showed 24·35; No. 83305, 24·20. Thermometer 75°.

On our arrival at Kibonoto my first idea was to proceed at once by Arusha-wa-Jun and Kisongo, but a moment's thought showed the uselessness of the attempt after the enormous hongo we had already given at Kiraragwa. There was a considerable hongo at Arusha, and another large hongo at Kisongo, that being another "door" to the Masai, besides a smaller one at Ngaruka.

To attempt to pass now alone would mean that we should have found ourselves at Ngurumani unable to proceed a step further. There was only one way open, to return to Taveta, and there join another caravan, and thus lessen the enormous strain on our resources, besides mutually adding to our safety.

Fearing a pursuit, we wasted no more time at Kibonoto than was necessary in order to procure food for our desert march to Taveta. In five days we reached the latter place, only to learn that no caravan would leave there till the end of Ramadan (it commences in July). Here was an enormous delay, with nothing to do and men eating up our diminished stock of goods. To remain in Taveta to nurse my bitter disappointments would have killed me. More goods, especially iron wire, were urgently required if I did not want to find myself hopelessly stranded half-way to the lake, owing to the enormous expenses in hongo and food in the Masai country. I at once made up my mind to proceed to the coast, and after a day's rest I set off with a party of twelve men, not daring to bring more, knowing as I did that there was hardly a man in the caravan who did not want to run away. They are, however, virtually imprisoned at Taveta, as their guns have been taken from them.

Two days brought me to the Matati, and half a day to Ndara. The next march was from Ndara to Taro, a march probably without rival in the annals of East African travelling. We travelled rapidly from 6 A.M. to 4 A.M. of the following day, with a rest of only an hour and a half, without food or a drop of water. After a few hours' rest we proceeded to Gorah, and next day to Rabai, having done the whole distance in five marches, thus eclipsing Rebmann's feat.

In a very few days I shall be once more on the road, with sufficient goods to render me independent of the Arabs, if an agreement cannot be come to. And I may say that now, after getting a fair insight into the situation, I am as sanguine as ever. In no respect have I lost heart. My principal source of annoyance arises from the loss of money entailed by our prolonged stoppage, which will compel me to shorten the time I had hoped to have for my exploration.

I have little more to add to give you an idea of the situation. In everything I have done I acted as I believed the Society would have me to act, and it was impossible for me to foresee that I was destined to stumble upon the heels of Fischer, or that he would raise trouble in his path of which I should have to bear the brunt. Neither could I help the fact that I had too small a caravan to force my way on finding our way closed, and be unable to take another till I had replenished my goods. The first was due to one of those accidents which will happen in spite of all precautions, the second to the state of the Society's funds.

I regret exceedingly that in my sudden departure from Taveta I left behind all my maps, &c., or my enforced leisure here might have been utilised in sending you a copy. I may say, however, that I lost no opportunity of taking observations. George's barometer and the boiling-point thermometer have been almost in daily use. I think I forgot to add that I visited Lakes Chala and Jipe, and that numerous observations on the geology of the country have been made. Martin, my assistant, is a capital fellow, and makes life in camp very much more pleasant than it would otherwise be. He has learnt the art of doing what he is told without question, while treated very much on a footing of equality otherwise.

On my arrival at Mombasa I despatched the telegram which you have doubtless received. I wrote also to Colonel S. B. Miles for various articles, my letters, &c. With his usual generous promptitude, he moved Captain Luxmoore, of the *London*, to lend his large steam-tug to bring them to me, as dhows at this season cannot be got, except at exorbitant prices, to go north. I cannot speak too highly of the extreme interest Colonel Miles has taken in the expedition, and the readiness he has shown to assist me in every way in his power.

Since my arrival here I have been the recipient again of the generous hospitality of the missionaries at Frere Town. I must now once more bid you adieu.

Believe me, yours truly,

To the Secretary R.G.S. JOSEPH THOMSON.

GEOGRAPHICAL NOTES.

Later News from Mr. Thomson.—We have received from the Eastern Telegraph Company (through the kindness of Sir James Anderson) the following telegram, announcing the return of Mr. Thomson with his renewed supplies to his camp at Taveta, and his preparations for a fresh start: "August 13th, Zanzibar, Colonel Miles to the President R.G.S. —Thomson arrived at Taveta on the 2nd of July, and intends leaving

on the 8th, viâ the north side of Kilimanjaro for Mosira, in company with a Pangani caravan, parting company at the place named. Sanguine as ever."—The place here mentioned, Mosira, will be found on Ravenstein's large map of Eastern Equatorial Africa, and on Archdeacon Farler's map (spelt Musiro and Msiro), far on the way to the shores of Victoria Nyanza, in S. lat. about 1° 50′ and E. long. 35° 40′.

Progress of Mr. O'Neill's Expedition to Lake Shirwa.—By telegram received since our last we learn that Mr. O'Neill had reached Shalawe. He left the coast on the 11th of June, and travelling by a new route through Mhadu took up his former road of 1881 at Mpagani, arriving at Shalawe on the 28th of June. He intended to leave Shalawe on the day after the date of his message, viz. the 9th of July, making for Namuroli and Malema. His observations make Shalawe in S. lat. 14° 55′ and E. long. 38° 52′; 1497 feet above sea-level.

Explorations in the Basin of the Niger.—Mr. E. R. Flegel who made a successful journey up the Benue some years ago under the auspices of the Church Missionary Society, has since been engaged in further explorations of that great tributary of the Niger on behalf of the German African Society. He has succeeded in reaching the sources of the Benue which lie in a range of mountains between Koncha and Ngaundere, in the Adamaua country, a region known to us only from the travels of Dr. Barth. Since his return he has offered to the German Society to undertake for them another expedition into Adamaua, in which he hopes to penetrate in a southerly direction through the perfectly unknown region lying between that country and the Congo, or failing in that, to turn westward and reach the Cameroons. The German Government have granted a sum of 40,000 marks towards the expenses of this new expedition. Unfortunately the state of his health prevents Mr. Flegel from starting immediately.

The German East African Expedition.—The scientific expedition, under Dr. Böhm and Herr Reichard, which has been working for some time past in the direction of Lake Tanganyika, reached Karema, the Belgian station on the Lake, on the 10th of February last. They were making their way from their old station at Gonda to Lake Moëro, their route lying to the south of that formerly followed. The last news is dated March 3rd, when they were preparing to cross Tanganyika to the mouth of the Lofuku river, from which point they would take the most direct route to Lake Moëro. At Karema they found the papers of their late companion Dr. Kaiser, who died October 19th, 1882, whilst surveying Lake Rikwa. His original map and extracts from his journal have reached Berlin, and will be published in the next number of the 'Mittheilungen der Afrikanischen Gesellschaft.'

Dr. Stecker's Explorations in Abyssinia. — Dr. Stecker, the former companion of Gerhard Rohlfs, has been continuing his excellent work in

southern Abyssinia and the neighbouring Galla country. He has explored the river Didessa, which he identifies with the Juba, and has visited the Lakes Betsho and Zuai, and the previously unknown Lake Miete situated in the country of the Arusi Gallas, about 40 miles distant from Lake Zuai. A war between Godjam and Shoa compelled him to quit the country before the termination of his surveys, and he returned to Massaua in July last.

Colonel Prejevalsky's New Expedition.—In a letter to our correspondent, Mr. Delmar Morgan, Colonel Prejevalsky announced his intention of starting on his third great expedition to the heart of Asia early in August. He will proceed first to Kiachta, and his object is to explore the whole of Northern and part of Eastern Tibet from the sources of the Hoang-ho to the Pamir, diverging south, if possible, to the Upper Brahmaputra. He intends again to visit Lob Nor, this time from the Tsaidam side. Experience having proved the impossibility of travelling with camels on the high Tibetan plateau, he will form depôts of provisions along the northern foot of the Kuen-lun and from these points enter Tibet in light marching order. The probable localities fixed upon for these stores are Irgizyk in Eastern Tsaidam, Lake Gast in Western Tsaidam, Lob Nor, and the town of Keria. In this way the expedition will gradually advance from east to west along the Kuen-lun. The traveller will be accompanied by his former assistants Eklon and Robarofsky, besides a young officer named Kozlof; and he takes with him his former interpreter, a native of Kuldja, and sixteen Cossacks and soldiers as escort. Eklon with six Cossacks will remain at the depôts. The scientific equipment and arms of the party will be most complete. The expedition is expected to leave Urga at the beginning of October, travelling viâ Alashan, Koko-nor, and Tsaidam, and thence by the sources of the Yellow River to Tibet.

An Expedition to Chitral.—According to letters from India, Mr. McNair of the Indian Survey Department has succeeded in penetrating to Chitral, which has now been entered, for the first time, by a European explorer. The story of his adventure, as told in the *Civil and Military Gazette* of Lahore, is somewhat curious. It seems that trans-frontier news-agents, in their reports, mentioned that a *Feringhi*, disguised as a Mahommedan, had crossed the north-west frontier, and had made his way through the Swat valley to Dir, where he was kindly received by Rahmatulla Khan of Dir, a chief who is well known to frontier officers for his persistent rivalry with the younger Mian Gul, the son of the famous Akhoond of Swat. Disguised Feringhis figure not infrequently in reports from beyond the frontier, and, as often as not, turn out to be quite mythical. This time it was a real Feringhi, and no other than Mr. McNair, of the Indian Survey Department. Mr. McNair had undertaken this expedition entirely on his own responsibility, going "on

leave" for the purpose. The Indian Government, according to its accustomed policy, would have refused to sanction the enterprise; so Mr. McNair's disguise was assumed to deceive the vigilance of our frontier officials, as well as to secure his safety in the inhospitable regions which he hoped to traverse. He was accompanied by a native explorer, known "in the profession" as the Saiad. The Saiad has already done good work in the Survey Department, and is one of Major Holdich's best men. Shortly after crossing the frontier, Mr. McNair's disguise was unfortunately detected. He succeeded, however, in reaching Chitral; and in a letter written from that place—the latest received in India up to the end of June—he expressed his intention of going on to Gilgit. A native report reached India that the traveller had actually arrived in Gilgit; but a telegram (of June 29) from Sir Oliver St. John, the British Resident in Kashmir, showed that this was a mistake. The journey from Chitral to Gilgit would be somewhat perilous. There has lately been fighting in those parts. Yassin, on the direct route between Chitral and Gilgit, is in the hands of the Khan of Tangir, a brother of the man who murdered the unfortunate Hayward. It is possible, however, that Mr. McNair may not take the direct route; and he may have had reasons of his own for not disclosing, in his letter from Chitral, his real plans. As likely as not, he will not leave Chitral without making a determined attempt to get into Kafiristan, and he may thence try to work his way round by the head-waters of the Oxus. This would be the safer route, and would give the best results, especially if Mr. McNair is able to reassume his disguise. As it is, Mr. McNair's adventure should win him no little renown in geographical circles, in Europe as well as in India. He is the first English traveller who has succeeded in penetrating to Chitral, and being an able geographer and trained observer, his report will be of considerable value.

Hannibal's Route across the Alps.—In the current number of the *Alpine Journal*, Mr. Douglas Freshfield discusses the well-worn subject of the Pass of Hannibal. He points out that of late historians and critics, both in England and Germany, have taken up a position directly opposed to that of most recent geographers and travellers, e. g. Mr. J. Ball, Mr. Bunbury, and Professor Bonney. While the latter discard the little St. Bernard, it has been put forward by the historians with singular confidence as the unquestionable Pass of Hannibal. Against this assumption Mr. Freshfield protests, on the ground that the distance from the pass to the plain is double that required by the narratives of Polybius and Livy, and also because a majority of the statements made in support of this Pass prove, when closely examined, to be inaccurate. Mr. Freshfield's own argument is briefly as follows:—If we trust Polybius alone, the Pass of Hannibal must be left an open question as between the Mont Cenis, the Mont Genèvre, and the Col de l'Argentière; if we take Livy into account, we are confined to the road up the Drac to Gap, and the

passes leading from the Durance; and if we may believe the fragment of Varro preserved by Servius in his Commentaries on Virgil, which many critics have strangely pronounced unintelligible, we must decide for the Col de l'Argentière. Varro mentions five Passes beginning at the sea and ending with the Graian Pass, and takes Hannibal over the second. These Passes are now represented by the five carriage roads of the Cornice, the Col de l'Argentière, the Mont Genèvre, the Mont Cenis, and the Little St. Bernard. Proof is brought forward that the Argentière route was used by the Gauls and Romans, and the ground is said to be suited to the adventures attributed to the Carthaginian army. To these a parallel may be found in the difficulties encountered by French armies on the same route in 1515 and 1744. The loose and (had we not the original authorities) in some respects unintelligible narratives of the former campaign given by Sismondi and Michelet may further be compared with those by Polybius and Livy. Napoleon the First's view of the military importance of this Pass is shown by the title he gave to the road he ordered to be made over it, 'Route Impériale de l'Espagne en Italie.' In an appendix, Mr. Freshfield gives his reasons for believing that the Mont Cenis was well known to the Romans from the time of their conquest of Gaul, and cites some curious allusions in mediæval literature to the Passes of the Western Alps.

The Circumpolar Meteorological Stations.—Letters which have been received at Tromsö from the Swedish Meteorological Station in Ice Fiord, Spitzbergen, state that the winter was in every respect satisfactory. There was not a single case of scurvy or other serious illness, and nothing occurred to disturb the scientific work. The weather was also favourable, and the winter less severe than was expected, the lowest temperature recorded being 32° below zero (Fahr.) on the 2nd of January. The month of December was clear and fine, January and February were stormy and very cloudy. The three following months were fine with the exception of the sky being generally overcast. There was no lack of fresh meat as the sport was very fair, especially reindeer shooting, and the three harpooners who accompanied the party were in this, as in many other respects, of great service. There were shot during the winter sixty-one ptarmigans, nine reindeer, eighteen geese, twenty foxes, and some wild-fowl. The first walrus sloop was seen on the 26th of June, but the ice precluded any attempts to communicate with her until the 3rd of July, when a boat succeeded in reaching the Goose Islands, and on the 5th an attempt was made to reach the mouth of the fiord in order to exchange mails. It was considered that the sloops could have reached Advent Bay as early as the beginning of May. —Telegrams from Trondhjem announced that the *Pola* arrived there from Jan Mayen with the members of the Austrian Expedition, who had been absent for sixteen months. The *Pola* left Jan Mayen August 6th, the last observation having been taken on the 4th of that month. Lieutenant Wohlgemuth, the commander of the expedition, reported

"All well. Perfect observations; rich collections; geodetic and photographic views of the island." The expedition has thus been completely successful in the objects for which it was sent out, and neither officers nor men suffered from scurvy or other diseases. Among the experiences of the winter the most remarkable were the violent northerly storms. Snow began to fall heavily in the latter part of August, but the cold was not severe until November. In December the island was surrounded by ice on all sides, and in January the cold reached 25°·6 below zero of Fahrenheit. The temperature was less severe than was expected, but the storms were terrific; the waves washed over all the lower lying parts of the coast, and carried drift-wood and loose blocks of ice far inland, great ice-masses being cast up and stranded near to the observatories, which were 250 paces distant from the sea. The snow was seven feet deep in the neighbourhood of the station and when the thaw commenced in spring all excursions were stopped on account of moving snow and water, and the cascades leaping from the top of the cliffs were magnificent sights. A hundred and twenty-six aurora displays occurred during the long winter night. The *Pola* passed, on her way to fetch the party, Gibraltar on the 16th of May, arrived at Reykiavik on the 30th of June, and proceeded direct for Jan Mayen. She was not expected to return before September, but the ice turned out to be much more favourable than it was last year. She left Trondhjem on the 14th for Hamburg, where Count Wilczek, the munificent supporter of this noble undertaking, would be present to receive the members of the expedition.* —The German Circumpolar party in Cumberland Sound will soon be relieved, the steamer *Germania* having left Hamburg for that purpose about the 20th of August.

Trade with Siberia viâ the North Cape.—The Russian steamer *Louise*,† commanded by Captain E. Dallman, left Hammerfest for the Yenisei on the 17th July. It will be remembered that she was last year prevented by the ice from crossing the Kara Sea, and warehoused her cargo at Hammerfest ready for another attempt this season. Captain Dallman has undertaken to keep a sharp look out for the *Varna* and *Dijmphna*, and will of course render them any assistance in his power if required. According to a notice in the *Deutsche Geogr. Blätter* the present voyage of the *Louise* will, if unsuccessful, be the last attempt that she will make to navigate the Kara Sea. The captain is, however, an old and experienced Arctic seaman, and as the latest reports from walrus-hunters and fishermen state that the condition of the ice is favourable, there seems to be a good prospect of her reaching her destination. The *Obi* and *Nordenskiöld* ‡ put in to Tromsö on their way to Novaya Zemlya, and sailed again the following day.

* Sir Allen Young has received a letter from Lieutenant Beers, the Commander, dated Hamburg, August the 18th. We learn that the party landed there on the 19th, and were received with great rejoicings.

† See *ante*, p. 406. ‡ Ibid.

The 'Dijmphna' and the 'Varna.'—Up to the present moment (August 26th) no news whatever has come to hand as to the fate of these two vessels, with Lieut. Hovgaard's North Polar expedition and the Dutch Meteorological party on board bound for Port Dickson, both of which were last seen in September 1882, frozen-in in the Kara Sea. The *Willem Barents*, which has during the present summer cruised in the Kara Sea, reports that she had found no trace of the two vessels, neither had any been discovered by the natives along the adjacent coast. As, however, open water was found along the coast of Novaya Zemlya as early as June last it is surmised that the two vessels have got free early in the spring, and proceeded to Port Dickson, or a neighbouring port, from whence we must now look for news viâ one of the Siberian towns. That the vessels got free in October last, as expected by Hovgaard and Nordenskiöld, is now hardly probable as had this been the case we should certainly have had despatches from them ere this. Hourly tidings may arrive of the two expeditions, if safe, but in the meantime a certain amount of anxiety is felt regarding them, particularly for the *Varna*, which had not been strengthened for wintering in the ice.

The Supposed Ancient Map discovered in Iceland by Baron Nordenskiöld.—Mr. Major sends us the following letter on this subject which he has just received from Mr. Oscar Dickson, expressing at the same time his natural disappointment and regret:—"Gothenburg, 20th Aug., 1883.—Dear sir,—In the August number of the Royal Geographical Society's 'Proceedings,' you give a letter from Baron Nordenskiöld, dated Reikiavik 10th June, in which he states in greatest haste, the anchor already weighed, that he had come across a fragment of a chart resembling Zeno's, that he could not there determine its age, but that he had sent it to Stockholm to be copied. The chart is now in Sweden, but as I am of opinion that it is of later date than the *publication* of the Zeno map in 1558, I have thought right to suppress the document until, on his return home, I can have the Baron's decision on the subject. Yours &c., Oscar Dickson."

Obituary.

Rev. Robert Moffat, D.D.—By the death of the veteran missionary, Dr. Moffat, our Society has lost a much-respected Member, whose contributions to the geographical explorations and ethnology of the South African interior, although long since eclipsed by the more brilliant achievements of his son-in-law, Dr. Livingstone, and other travellers, were of considerable value at the now remote time in which they were made. He was born on the 21st of December, 1795, and first went to Africa, in the service of the London Missionary Society, in 1816, settling, after some preliminary tours, among the Bechuanas, to the west of what is now the Transvaal Republic, for a long series of years. He returned to England finally in 1870. In 1842 was published in London his 'History of Missionary Labours in South Africa';

but his chief literary labours were his translations of St. Luke's Gospel, the Psalms, and other portions of the Bible into the Bechuana language. In 1819 he married in Cape Town Miss Mary Smith, who lived and worked with him until his retirement and died a few months after their arrival in England. One of his daughters was married to Dr. Livingstone and died on the Zambesi in 1862. His son, Mr. Robert Moffat, became Government Surveyor at the Cape of Good Hope, and in this capacity made extensive explorations in Namaqua-land along the Orange River, and from Colesberg to Steinkopf in the years 1854–5–6, his Report of which was published, illustrated by a map founded on his surveys in the twenty-eighth volume of our 'Journal.' In 1872 the degree of Doctor of Divinity was conferred upon him by the University of Edinburgh. In November 1873 our Council offered an Honorary Life Fellowship of the Society to Dr. Moffat, which he accepted. In 1882 he was made a Vice-President of the London Missionary Society, and in 1873 the handsome sum of 5800*l.*, subscribed by his admirers, was presented to him as a testimonial of their appreciation of his labours. He died on the 9th of August last, at Leigh near Tunbridge Wells, and on the 16th was buried in Norwood Cemetery, if not with pomp, yet amid manifestations of high regard and veneration.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—July 6th, 1883: M. Ant. D'Abbadie, of the Institute, in the Chair.—A letter was read from the Geographical Society of Lisbon, announcing the intended visit to Paris of Professor Ant. Augusto D'Aguiar, the adviser of the Portuguese Crown and a peer of the realm, and Vice-President of that Society, who is accompanying on a voyage of study His Royal Highness the Duke of Braganza, heir presumptive to the throne of Portugal. The letter requests the Geographical Society of Paris to give M. D'Aguiar all the assistance and co-operation which he may require.—The Geographical Service of the Army transmitted, through the Minister of War, nine sheets of the map of the environs of Tunis, scale 1:20,000, and also maps of South Oranais, scale 1:400,000. M. Maunoir, the General Secretary, pointed out the importance of the latter, in connection with the geography of Algeria. He stated that up to the present time surveys had only been made by expeditionary bands or military columns, and these therefore included merely the narrow strips of country traversed by the parties, there being enormous gaps between them. These itineraries, having no connection with each other, and no astronomical or geodesical bases, were necessarily incomplete, but this is not the case with the maps in question, which, having been prepared from a regular course of surveys, present South Oranais as far as Figuig in a totally new aspect.—The Minister of Public Works forwarded from the Map and Plan Department, which is under the direction of M. Cheysson, a member of the Society, a map of the Department of Nièvre, just prepared by that administration.—His Imperial Highness the Archduke Louis Salvator of Austria presented to the Society a magnificent volume, entitled 'Die Stadt Palma' (the town of Palma), of which he himself is the author, and announced that copies of his other works were in course of transmission. These gifts are the more valuable as the works of the Prince are published in a superb "édition de luxe," and are intended only for private circulation; moreover, the author himself is a great traveller.—On the table, where the newly-presented books (including the one just mentioned) were exhibited, there was a very ingenious apparatus in the form of an astronomical chronometer. This is the invention of M. E. Agyar, a native watchmaker of Aleppo. In the course of the meeting

a compatriot of the inventor explained this clever piece of mechanism.—The Minister of Foreign Affairs forwarded a letter from M. Ledoulx, French Consul at Zanzibar, dated May 22nd. From this it appears that the English geologist Thomson had sent a communication dated from Bura, in which he announced his intention of directing his course to Taveta, and from there to travel northwards, making a detour of the peak of Kilimandjaro, with the view of reaching the Sabaki river. He would then ascend this stream and determine its source, provided the natives were not too ill-disposed towards him. This accomplished, he would push still further north, and visit the eastern part of Lake Victoria Nyanza. The letter goes on to say that, while M. Thomson was following his northern route, Dr. Fischer, having started from Tanga, had taken the southerly direction in order to reach Kilimanjaro. He should have arrived by this time in the region of Chagga, and he will doubtless furnish some valuable information on the sources of the Rufu, which waters this rich mountainous oasis. M. G. Revoil had left Zanzibar on the 1st of the month (May), but no news had up to that time been received of his arrival on the Somali coast. The missionaries of the "Saint-Esprit" had just completed the manuscript of a Swahili-French and French-Swahili Dictionary, which it was their intention to publish. This dialect, which is spoken on the sea-coast, is also the principal language of all the peoples between the East Coast and Lake Tanganyika. —A communication was received from M. Romanet du Caillaud on the mineral and forest wealth of the Island of Madagascar. He would have France declare the law of 21st April 1810 on mines, applicable in the case of the kingdoms of Boueni and Ankara, the sovereignty of which has been ceded to her.—Madagascar formed the subject of another communication on the part of M. Gabriel Marcel, attaché to the Map Department of the National Library at Paris, and author of a recent work entitled 'Les droits de la France sur Madagascar.' In this work he has published a map (for the first time in print) of the island, which was prepared in the seventeenth century, and has been preserved in manuscript in the National Library. The name of the author of the map was formerly unknown, but M. Marcel stated that he had just discovered it among other documents at the record office of the Minister of Foreign Affairs. The author's name is Grossin.—In a letter, dated 18th October, 1882, M. Paul Soleillet informed the Society that he had met with a magnificent reception at Shoa from King Menelik II., who even invited him to be present at the marriage of his daughter. In a month or six weeks from then the traveller intended to proceed to the country of the Gallas, and from there to Kaffa, which is really under the sway of Menelik. M. Soleillet will then return to France, in order to escort an embassy, which the King of Shoa intends sending to the President of the Republic.—In a previous letter M. Soleillet had made some serious charges against Aboubakar or Aboubekre, the Pacha of Zeila, accusing him of the actual murder of two French travellers, MM. Lucereau and Arnoux. To refute these accusations, M. Denis de Rivoyre addressed a letter to the Society, in which he maintained that Aboubekre was, on the contrary, a friend of France and the French. It is to him, it appears, that France is indebted for the acquisition of Obock. At that time, the writer stated, his eldest son had just escorted from Obock to Shoa the first caravan of goods, sent by the company for establishing French factories in Africa, the formation of which was announced at the last meeting of the Society. The caravan had thus fortunately arrived safely at its destination.—It was then announced that the Society had received from Captain Mattei, French Consular Agent at Brass, a very valuable collection of photographs of the district and natives of the Lower Niger, together with accounts of such localities as Onitscha, Igbebe, Egga, Loko, Lokoja, &c.—A long letter was read from M. Claude Trouillet upon the Island of Boulam in the Archipelago of the Bissagos (Portuguese Guinea), which is so little known and

visited. The letter is dated from that island, 26th May, 1883. Neither the area of Boulam nor the number of its inhabitants is known, these being details which the Portuguese are not anxious to make public. The correspondent estimates that the longest part of the island measures about 17¼ miles (27 to 28 kilometres), and the average breadth he puts at about 6½ miles (10 to 11 kilometres). The mean temperature ranges from 86° Fahr. (30° C.) indoors, to 108° or 112° Fahr. (42°–45° C.) in the sun. Rain falls in abundance from 15th of July to the end of August, when it gradually diminishes in quantity till October, which is the end of the rainy season. The surface of the island is regular, and the water is neither scarce nor unwholesome. European vegetables thrive well, and among the products of the soil the following are mentioned: rice, maize, manioc, yam, cocoa, sugar-cane, palm-oil, ground-nuts (arachis) oil, ginger, coco-nut trees, &c. The chief textile materials are the ramee or China-grass plant, and a species of cotton, which, however, is too short to be utilised. The correspondent is not very enthusiastic in speaking of the Portuguese administration there; he says there is a governor having the rank of Colonel, and a harbour-master. The garrison is 130 strong, and the police agents number 20. There is a secretary's office with various employés, and the custom-house takes charge of the postal service. The blacks are a fine race, but not so powerful as might be expected, which is doubtless owing to the fact that their food consists solely of rice and fruits. They excavate their canoes from great trees, called "fromagers" (the silk-cotton trees). Although they have only their knives for tools, they make some very curious articles, and among others wooden locks, fetishes, and various small things. The women present some very pretty types. The common diseases to the white man are intermittent fevers and the tænia, but it is easy to rid oneself of the latter. Some Europeans can only remain two or three years in the island without having to return to their native country, while on the other hand there are Frenchmen who, after a residence of ten years, still enjoy good health.—M. Oukawa, Secretary of the Japanese legation at Paris, apologised by letter for his inability to attend the meeting, at which he had purposed making some remarks. It is his intention to speak upon the population of the Empire of the Rising Sun. In the meantime, however, he forwarded the programme of the Society of Political Economy and Statistics at Tokio, of which he is a member. The programme deals with the subject which he proposed to discuss, he himself having studied it very critically during the long voyage from Yokohama to Marseilles (forty-five days at sea).—General Venukoff sent a communication, in which he notices a very important report by Colonel de Tillo on the levelling of Russian railroads, and announces the publication of a map of the southern part of the coast province of Siberia or Russian Manchuria. Also that in the month of June a naval expedition, sent by the Government, had started with the object of making soundings in the eastern part of the Caspian Sea. This expedition is connected with the scheme for establishing a direct route, projected by General Tchernaieff, between Russia and Khiva, across the Ust-Urt. M. Venukoff gives further the result of M. de Tillo's measurement of all the rivers of Russia in Europe which are navigable for ships and rafts. The total length is only 49,000 miles (79,000 kilometres), which appears very little for such a vast extent of territory.—A despatch, dated 16th May, from the French Minister in Mexico, informed the Society that M. Aug. Tardy, a French engineer who has resided for a long time in the country, had just been charged by the Mexican Government with a mission to the province of Michoacan, to study the mineral, agricultural, and forest wealth of this district, which is one of the finest in Mexico. Apart from his official mission, M. Tardy will devote himself to the study of the fauna, flora, and mineralogy of the country; he will determine the heights of the mountains, survey the courses of the principal rivers, and take photographs of the

most important scenery, &c.—From Tacna (Peru), M. Thouar wrote on 17th May, describing the plan which he intended to adopt in order to discover the remains of the Crevaux Mission, and to ascertain in a particular way the causes of the massacre of the unfortunate traveller. "I am," says he, "resolved to attempt the impossible that I may find the prisoners, rescue them, and bring back the remains of those who have fallen victims to the weapons of the Tobas."—M. Romanet du Caillaud, already mentioned above, then opened a discussion on the question of the adoption of a universal meridian. An Englishman, M. Parker-Snow, the author of works on the Arctic Regions, had proposed to the Society to take, as the point of departure, a rock in the middle of the ocean, namely St. Paul's Rock. M. R. du Caillaud thought that it was a question of a moral rather than a material centre. This moral centre he believed he had discovered in Bethlehem, the birthplace of Jesus Christ, and the initial point of the common era.—In conclusion, Dr. Delisle addressed the Meeting, giving some news of the French Meteorological Mission despatched to Cape Horn. The station, it appears, has been established in Orange Bay since September 1882. Numerous anthropological observations have been made and casts taken of the heads, feet, and hands of the Fuegians, who are the neighbours of the Mission. Thanks to the Tekinikos of Orange Bay, the Mission has been enabled to form a very curious ethnographical collection, in which the most important article is a canoe of large dimensions, fitted with all necessary utensils, harpoons, &c.

——— July 20th, 1883: M. Bouquet de la Grye, Vice-President of the Central Commission, in the Chair.—In the absence of the General Secretary, M. Maunoir, who was at Amsterdam in connection with the Exhibition there, M. Jules Girard, Secretary, officiated, and gave an abstract of the correspondence. He intimated the death of General Sir Edward Sabine, the oldest corresponding member of the Society, his name having stood on the Society's roll since 1827. Also that, since its last meeting, the Society has lost M. François Beslay, editor of the Paris newspaper *Le Français*, and M. J. James Ryan, the correspondent of the *New York Herald*, and member of the foreign press committee at Paris.—M. Caspari, hydrographical engineer, transmitted the topographical map of Tongking, which the Map and Plan Depôt of the Navy has just published; it was exhibited in the hall, together with some photographs of the Lower Niger, taken by Captain Mattei, French Consul at Brass. This map is the most important which we possess of Tongking, representing, as it does, the exact state of our knowledge of this region. According to it, the frontier between China and Tongking is the same as indicated by M. Romanet du Caillaud, and it also agrees with the observations made on the spot by Commander Gervais; in addition to this, it confirms the ancient maps, especially that in Kiepert's Atlas. The southern frontier, which from a political point of view is of less importance, has been traced in accordance with information obtained on the spot by M. Caspari himself.—M. A. Rhoné presented the Society with a work, which he has published in *La Chronique des Arts* (July 1883), on the archæological excavations now taking place in Egypt under the auspices of an English Society formed for this object. This volume gives a *résumé* of the discoveries made in the spring of the present year, and the programme of the excavations which it is proposed to undertake next year. The author thinks a very judicious selection has been made.—Mme. Carla Serena presented a copy of her new work, entitled 'Hommes et choses en Perse' (Paris, Charpentier, 1 volume 12mo.).—A letter was received from M. Martin la Meslée, from Sydney, inclosing the prospectus announcing the formation of the new Geographical Society, called "The Geographical Society of Australasia," of which he is one of the promoters, and the General Secretary *pro tem.* He states that already, within a month, more than 200 members have been enrolled, and that the Society, at present hardly formed, proposes to undertake the exploration of New Guinea from

the extreme east to west.—General Venukoff then gave an account of the researches of M. Lessar as to the existence of the supposed ancient bed of the Oxus to the south of Khiva. M. Lessar has found no trace of the ancient river. During his expedition he has lost nearly all his beasts of burden, his escort has narrowly escaped death from thirst and hunger in the desert, and he has been compelled, in order to save himself and followers, to have recourse to the assistance of the Khivans. Under these circumstances, after three years' painful experiences, he is desirous of returning to Europe. M. Venukoff stated that the Society of Naturalists at Moscow had sent a young savant into the districts watered by the sources of the Oka, with instructions to study the geological formation of this region. Similar investigations are being made in the countries traversed by the Volga, so that, with the addition of works of the same nature already executed in other parts of Russia, there will soon be all the materials necessary for the preparation of the geological map of Europe (at least as far as the eastern part of the Continent is concerned), which is to be executed in accordance with a resolution of the last International Geological Congress. M. Venukoff then indicated the geographical position of the capital of the Merv oasis, which, according to M. Gladycheff, who has just completed the calculation of the astronomical observations made by him in South Turcomania, is situated in N. latitude 37° 35′ 19″, and 59° 27′ 20″ longitude east of Paris. The position of Merv, as shown on our maps, agrees very fairly with this determination.—A communication was read from Teneriffe, sent by M. Alph. Milne-Edwards, of the Institute, Professor of the Natural History Museum, who is engaged on a scientific mission on board the *Talisman*. He is instructed to make soundings and dredgings in the Atlantic Ocean, and in his letter states that his operations are going on as well as could be desired. The coasts of Morocco and of the Canary Islands have been explored, and the ship will now proceed to the Cape Verd Islands, and continue dredging all along the African coast, still so little studied from this point of view.—Tidings, dated from Koumi (Great Beledugu) in Senegal, were received from Dr. Bayol, to the effect that his mission had arrived in this country of Koumi, at a distance of 66 miles (106 kilometres) to the north of Bamaku. He has, it appears, concluded two treaties, placing Nossombugu and Koumi under the protectorate of France. He hoped to arrive in a week or so at Damfa (or Damsa), which is only two days' march from the capital of Murdiari. These two countries of Damfa and Murdiari, the approach to which is through highly interesting districts and hitherto unexplored, carry on, according to the traveller, an important trade with the caravans coming from Ualaba and Timbuctu. Dr. Bayol expresses his hopes of being able to obtain at Gumbu, if he should reach there, some valuable information on the country of el Haod, which is as yet unexplored.—M. Antoine D'Abbadie, of the Institute, President of the Central Commission, sent a letter apologising for his inability to be present at the meeting, over which he should have presided, this being the last meeting of the Session 1882–3 (the Session 1883–4 will not commence till next November). The communication was also to rectify certain errors contained in the paper *Le Moniteur Universel* (5th July), in which was reproduced or merely analysed a letter of M. Paul Soleillet, who is now travelling in the East of Africa. The latter, according to M. D'Abbadie, is by no means the first European who has explored Jimma and Kaffa, M. D'Abbadie resided there before him, and Mgr. Massaja proceeded in 1855 into the same districts, accompanied by P. Cesare, an Italian monk, taking the same direction as M. D'Abbadie.—M. A. Thouar wrote, on the 31st of May from La Paz, that he was going to start for Carapari early in June, to commence a search for the remains of the Crevaux Mission. He states that the Bolivian Government had ordered an expeditionary corps to march on Teyo,

the capital of the Tobas; the departure of this column being fixed for the month of June, and Caiza chosen for the starting-point. Part of this corps is to occupy Teyo, while the other division will follow the right bank of the Pilcomayo as far as Ascension.—The commander of the French ship *Le Romanche*, writing from Punta-Arenas on 25th May, announced that, despite the unfavourable conditions of climate, the results already arrived at by the Mission at Cape Horn, gave hopes that the expedition will really be very profitable as regards the knowledge which we possess of that region. Geography will without doubt benefit by the hydrographical explorations effected in the neighbourhood of this Cape, which will cause the undefined regions still shown on our maps, to vanish therefrom.—M. Ch. Hénard presented to the Meeting his "Cosmographe Mobile," which is an improvement upon the cosmographical pendulum, invented by M. Mouret, and exhibited at the Universal Exhibition in 1878. This apparatus, which realises the scientific union of the sphere with the pendulum, places before our eyes a world in miniature, and enables us to comprehend at once the position of the earth in space, the inclination of its axis, the limits of day and night, the dawn and twilight, the true and the mean time, the difference between them and the equation of connection, the correct time of day at every point on the globe, the distribution of the seasons, the polar days and nights, &c.—phenomena which are all known in theory rather than in practice. The Mouret pendulum, in representing the earth with all its simultaneous movements and in its relations with the heavens, is indeed a wonder. "It is," as M. Flammarion said in *La Nature*, "to the common pendulum what the railway is to the vehicles of our ancestors."—The orders of the day having been exhausted, M. Bouquet de la Grye dismissed the Meeting, and declared the Geographical Session of 1882–3 closed. It had always been the custom of the Society to hold a meeting during the first fortnight in August, and another in the second fortnight of October. These two meetings will in future be abolished, and the recess of the Society will last three clear months. As stated above, the Society will not resume its meetings till the month of November.

Geographical Society of Copenhagen.—At the fifth meeting of this Society, Councillor Trap, President, in the Chair, a paper on Swedish North Polar Expeditions was read by Professor Ed. Erslev, the Secretary.

The author commenced by drawing a parallel between the present age as an "era of discovery" with that historical time, distinguished by this appellation, in which Columbus, Vasco de Gama, and Magellan lived. He then went on to say that, although the Society had had the fortune to receive the explorers of the North-East Passage on their return, it was to their general regret that they had not also on that occasion been able to have the munificent equipper of that expedition among them, viz. Mr. Oscar Dickson, the Swedish Mæcenas. Early in this century, he said, two brothers emigrated to Gothenburg from Scotland, and founded the well-known firm of Dickson and Company. They were the brothers Robert and James. Besides developing a great commercial concern, they became known for their liberality. They had transformed the maxim *Noblesse oblige* into *Richesse oblige*, and acted on the principle that he to whom great wealth befel had also his duties. Formerly the Church claimed a tithe of a man's possessions, but now it was claimed by the class of men of talent which had the desire, but not the means, to devote themselves to science or art. Everywhere in their adopted country there were signs which spoke of the kindness and munificence of the two brothers. Thousands of people in want had been assisted, labourers' dwellings erected, two universities built, &c. The sons of James Dickson had followed in the footsteps of their father. The eldest, James J. Dickson, had given large sums to public institu-

tions, and had been surnamed "The Philanthropist." The younger, Oscar Dickson, had done so much for the benefit of science in his country, that he had been called the Swedish Mæcenas. The speaker then said that by the great wars of Sweden in former days, the people had learnt that war was not the road to happiness. For more than half a century the nation had enjoyed the blessings of peace, and, in spite of the unfavourable climate and the poor soil, the people had steadily advanced towards that goal of prosperity which is the object of every nation; and at the same moment it might be noticed that in the native land of Linnæus and Berzelius much was done for the progress of arts and science. Laurels gained in this field were more glorious than those obtained in war. On the other hand, nobody could help admiring the excellent show which Sweden always makes at the various international exhibitions. Although having twice as many inhabitants as Denmark, and being much poorer, Sweden was never absent from these exhibitions, and she did wisely in demonstrating that she had culture of her own. When at the recent geographical congresses in Paris and Venice, he had spoken with foreign *savants*, there were two names which were always referred to, viz. those of Nordenskiöld and Oscar Dickson. The one devises schemes of exploration and carries them out, the other overcomes all difficulties attending them, and furnishes the funds, if necessary. The two stand side by side, and it was thus that one expedition after another had been despatched from Sweden. They had also both found an ardent supporter in King Oscar. From its own geographical position it was but natural that the Swedish nation should be bent on discoveries in the Arctic regions, and it was Lovén who had first called his countrymen's attention to Spitzbergen, whither he had made a voyage in 1837. Twenty years after, Otto Torell proceeded to the island, a voyage which he repeated in 1861, then accompanied by Nordenskiöld. Since that time Sweden had despatched one expedition after another to the Arctic regions, and Oscar Dickson had given valuable assistance to most of them. In order to understand this, he would give a *résumé* of the Arctic expeditions which had been supported by him:—1. The expedition, in 1868, to Spitzbergen, was principally defrayed by him. 2. The expedition, in 1870, to Greenland, was wholly defrayed by him. 3. The expedition, in 1872–3, which, wintering at Spitzbergen, attempted to reach the North Pole, but without success, was entirely defrayed by him, he having also paid the deficiency which arose in its cost on returning. 4. The expedition, in 1875, to the mouth of the Yenisei, was entirely defrayed by him. He had on that occasion said to Nordenskiöld, "The expedition of 1872 has partly failed, but we must not finish with a failure." 5. The expeditions, in 1876, by sea and by land to the mouth of the Yenisei were chiefly defrayed by him. 6. The *Vega* expedition, in 1878–80, was for a third part shared by him; and, finally (7), the expedition despatched this present year to Greenland was entirely defrayed by him. In addition to these magnificent expeditions, he had contributed to a number of minor scientific undertakings. Having next referred to the great interest which Oscar Dickson always had taken in Arctic voyages, he, the speaker, stated that whenever he had an opportunity of speaking to Mr. Dickson the theme of discussion was unintentionally generally the same, viz. Arctic exploration and Nordenskiöld. How great Dickson's interest was in the former might be realised from the fact that, when the Danish North Polar expedition in the *Dijmphna* had nearly to be abandoned for the want of 20,000 kroner (1200*l.*), he at once telegraphed, offering this sum towards the undertaking. Dickson had the greatest confidence in the success of whatever Nordenskiöld decided on undertaking. When the trio—King Oscar, Nordenskiöld, and Dickson—had at the Royal Palace in Stockholm discussed the circumnavigation of Asia prior to the start, Dickson advanced as one of the arguments in favour of the undertaking, that Nordenskiöld had conceived and executed plans which others had

deemed impossible. Neither could he forego to mention the true modesty which distinguished Dickson's liberality. As an example, he would relate that, some years ago, an intrepid Swedish botanist, Sven Berggren, was studying in New Zealand, from whence he wrote a letter to the *Aftonblad*, stating that he found himself compelled to return home for want of funds. The following day a large sum was placed anonymously in the hands of the *Aftonblad* for the use of Herr Berggren, and it was not till many years after that the donor's name (Oscar Dickson) leaked out. In conclusion, Professor Erslev referred to the great esteem in which both Nordenskiöld and Dickson were held abroad, and they—the Danes—might be proud of the fact that it was their Scandinavian brethren who had during recent years achieved so much towards exploring the regions around the North Pole.—Lieutenant Lauritsen then read a paper on the Danish Arctic explorer, Jens Munk, who, in the sixteenth century, attempted unsuccessfully to discover the North-West Passage, after which the Meeting adjourned.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

[Murray, John.]—A Handbook for Travellers in Denmark, with Schleswig and Holstein, and Iceland. Fifth edition. London (John Murray): 1883, post 8vo., pp. viii. and 156, maps. Price 6*s*.

The fourth edition was published so long ago as 1875, and the present one demands notice as including a brief guide to Iceland, which is new to the series. This includes a bibliography of works recommended as being serviceable to the intending traveller in the country, from which Mr. C. W. Lock's 'Home of the Eddas' and Mr. J. Coles's 'Summer Travelling in Iceland' are excluded, both recently published and containing much material especially written for the purpose named. The map (signed by Colonel Brine) is apparently the same as that in our 'Proceedings' for March 1882, illustrating Mr. Cuthbert Peek's paper, with the addition of red lines, dots for stations, and a few names. In the short reference to available maps, no mention is made of the map to Mr. Coles's work above mentioned, which is practically Gunnlaugson and Olsen's official 1844 map corrected to date.

ASIA.

Loftus, [Commander] A. J.—Notes of a Journey across the Isthmus of Kra, made with the French Government Survey Expedition, January–April, 1883, with explanatory Map and Sections, and Appendix containing Reprint of Report to the Indian Government by Captains Fraser and Forlong, in 1863. Singapore (Printed at the *Straits Times* Press, by A. Frois): 1883, 8vo., pp. 30.

As it is some twenty years since the idea of cutting through the Isthmus of Kra (Krā, Krà, or Kraw, as it is variously written) was discussed in anything like a practical way, it may save some trouble of reference if the position of the scene of proposed operations is roughly described. The isthmus is situated in the upper third of the Malay Peninsula, at about 10° N. lat., in Siamese territory; it is practically bounded on the west by the Pakchan river, which forms the extreme south-eastern limit between British Burma and Siam, and its narrowest point appears to be at the Kra Pass, 250 feet high, near the eastern head feeders of the Pakchan, forming the water-parting between that river and the Tong Kaa which flows eastward into the Gulf of Siam.

So long ago as 1863, a hasty survey of this isthmus, with the object of engineering operations similar to those referred to in the above title, was made on behalf of the Indian Government by Captain Alexander Fraser and Captain J. G. Forlong of the Bengal Engineers (whose Report is reprinted by Commander Loftus); and these officers came to the conclusion that a canal was impracticable, though they recommended the construction of a railway. The serious miscalculation by them of the height of the Kra Pass at only 75 feet materially detracts from the value of this recommendation; and it should be observed that the height given by Commander Loftus agrees with the observations of Lieut. Bagges, who in 1868 surveyed the Tenasserim and Siamese boundaries for the Indian Government.

It is needless here to remark upon the development of the cosmopolitan Singapore and the British Straits Settlements since the date at which the impracticability of avoiding the Straits of Malacca was considered to be established,—a development which could never have reached its present high state, if a more direct communication between India and China had been effected.

The French Government has, however, recently taken this more direct route again into consideration, and early in January last sent a surveying expedition for the purpose of ascertaining the practicability of constructing a maritime canal to connect the Bay of Bengal with the Gulf of Siam. Commander Loftus, a Fellow of this Society, to which he dedicates the highly important notes above referred to, accompanied this expedition, which landed at Paknam Chumpon on the east side of the Isthmus on 16th January, and left Muon Rehnong on the west about the 4th April; he was with it the whole time, as Commissioner for the King of Siam, and, while stating his ignorance of the conclusions at which the French engineers may have arrived, at once expresses his own conviction that such a canal as that proposed is quite impracticable.

The expedition was commanded by Lieut. Paul Bellion, of the French navy, and consisted of five scientific gentlemen, who were accompanied at the start by Dr. Harmand. A preliminary examination was made of the jungle country of the valleys of the Sawe and Langsuen rivers, which fall into the Gulf of Siam south of Chumpon Bay; this was effected by elephant parties, and Commander Loftus describes the most convenient order of marching on such a survey. The route taken was in a southerly direction to Langsuen, practically parallel with the Siamese Gulf coast, and crossing the Sawe and Taa ko rivers a few miles from their mouths; but any accurate examination of the former had to be abandoned, though it is stated to be a deeper and better stream than the Chumpon. After the laborious ascent of a hill, some 400 feet high, a ladder and platform were rigged up in a tall tree at its summit, and from this elevated position a perfect view of the country to the west was obtained; but mountains and hills of every shape and size, covered with the thickest jungle, were so massed together in one unbroken but varied outline that nothing to indicate the shape or inland direction of the Sawe valley could be detected.

Before reaching Langsuen, more open country with patches of cultivation, gardens, villages, and peculiar hills rising abruptly from the plain were met with; and the new town was found to have roads lined with native and Chinese shops and brick-built houses, &c. The banks of the river are high and about 400 feet apart; its bed is sandy, and the stream, though shallow, runs with greater velocity to the sea (some nine miles distant) than the other rivers crossed. After a stay of four days, during which attempts to get some idea of the direction of the river were foiled for the same reason as that above mentioned, the party set out in light canoes, which passed successfully over the numerous falls. These were at first slight, but as the tortuous, thickly-wooded, and picturesque river was ascended, they became stronger, more frequent, and difficult to pass, several small islands formed of rock shingle and sand being met with in the broad parts of the stream. This state of things, accompanied by more numerous hills and villages, continued to the village of Ban Song, the highest point attainable by boats, 56 geographical miles from Langsuen, situate on the eastern verge of the central back-bone ridge of the peninsula, 195 feet above Langsuen by aneroid. The ascent of a steep hill here was not rewarded with

success; as before, hills and mountains in grand confusion, clothed with primeval jungle trees of stately magnificence, were seen in every direction, but no indication of a valley could be traced.

On 4th February, with the help of elephants, the expedition succeeded in reaching the Kow Deng pass, west of Ban Song; this, the lowest gap in the back-bone range here, is the boundary mark between the Siamese provinces of Rehnong and Langsuen, and was found to be 630 feet above sea-level, by careful aneroid observations. Open country on the western side was soon reached after an abrupt and serpentine descent by the source of the Rat Koot river, and at Ban Rat Koot a launch sent by the Governor of Rehnong awaited the explorers, who steamed in it up the west coast to Rehnong. This is an important tin district, situate at the foot of a range of mountains two miles from the coast, inhabited by Chinese, with shops and roads on the increase, and regularly visited for trade purposes by the British India steamers. Its governor, Kaw Sim Kong, is an excellent administrator. Various scientific observations were made here, with an unsuccessful attempt to reach the Kow Kye pass from the Chah Hoon river, north of Rehnong. The valley of the Chah Hoon was followed to an elevation of 110 feet, but the gigantic hills towering overhead blocked further progress. The pass itself was described as very steep and dangerous, with a narrow track along its southern slope only wide enough for an elephant's foot.

The chief work of the expedition then commenced, the Pakchan being ascended to Muong Kra, from which point the engineers were to commence the survey and levelling of the Kra route eastward to Chumpon. Muong Kra itself is a good-sized village in an open place among the hills at the head of the Pakchan; it appears of little importance, as the cultivated parts are limited and tin is scarce; it has however considerably improved of late years. A depôt for provisions, instruments, &c., was formed at Taa San near the Pass, and on February 18th a start was made, and the highest point of elevation reached, careful readings of the aneroid being frequently made. The route rises and falls abruptly after leaving Kra, and continues to wind and rise through dense jungles of bamboos with large trees to the top of the Pass. Thence descending to Taa San it is steep, serpentine, and undulating, with fewer bamboos. Klong Hin Song, one of the Pakchan sources, was lost near the west side of the Pass, and one of the sources of the Tong Kaa was first met with close to its east side. Tigers, stinging flies, and leeches, are briefly alluded to by Commander Loftus as among the chief personal inconveniences to the surveyor in these parts. On the 20th, Chumpon on the east coast was reached by an excessively uneven and tortuous route through a densely-packed jungle growth, practically by the course of the Tong Kaa, which had to be crossed and recrossed several times.

Having returned to Bangkok on the 24th, a fresh start was made to Chumpon in March, and the route retraced to the depôt at Taa San, for the purpose of completing the surveys and levels; one of the results was very gratifying, as the independent observations of the two French engineers as to the height of the Kra Pass not only agreed *inter se*, but exactly corresponded with the elevation (250 feet) fixed by Commander Loftus with his aneroid.

After the details of the journey, Commander Loftus explains more particularly the various points examined which appear to be of special importance, both as to the tides, channels, roads, rivers, distances, geological formations, physical characteristics (with which Dr. Oldham's description tallies exactly), heights, latitudes, and longitudes. The chief of the technical objections which he urges against the scheme (epitomised in a letter to the French Commandant which he reprints), is the difficulty of excavating and depositing the enormous bulk of 83,854,222 cubic yards of mountain land (containing 75 or 80 per cent. of hard stone), which represents the hilly district of the Kra route; this is independent of the difficult and expensive works necessary in connection with the Pakchan and Chumpon rivers.

This interesting work is illustrated by a very detailed map of the whole area, showing routes of the expedition, heights, depths, &c., with sections of the Kra and Langsuen routes, and working sections of the former as regards the necessary measurements for mail steamers.

Vaux, [Le Bon] Ludovic de.—La Palestine. Paris (Ernest Leroux): 1883, large 8vo., pp. ii. and 527, map, illustrations. (*Dulau*: price 20*s.*)

This work has no pretensions to novelty, but consists mostly of the author's notes written on the spot during his recent travels in the Western Holy Land, supplemented by extracts from well-known publications by Guérin, Fouard, and De Vogüé, and from the old chronicles of the Crusades. The illustrations are by Chardin and Mauss, those by the latter having value from his architectural status and special knowledge of the country.

AFRICA.

Jeannest, Charles.—Quatre Années au Congo. Paris (Charpentier): 1883, 12mo., pp. xxxi. and 327, map, illustrations. (*Dulau*: price 3*s.*)

Relates the author's experiences on the Congo coast, which he visited in 1869 for trading purposes, returning early in 1873. Banana, Ambrizette, Kinsembo, Kinkoll, Ambriz, Kinzao, Pilar, and St. Paul de Loanda are the chief points at which he touched, and he has no personal knowledge of the great river beyond its absolute mouth. This book, however, contains much information on the capabilities of the country, the habits of tribes, and general life on the coast, and the illustrations are apparently from photographs in most instances. A few pages on the native language south of the Congo are given, with a Fiot vocabulary.

The map is a mere sketch, showing caravan routes, Portuguese real and supposed boundaries, &c.

GENERAL.

Hahn, F. G.—Insel-Studien. Versuch einer auf orographische und geologische Verhältnisse gegründeten Eintheilung der Inseln. Leipzig (Veit): 1883, 8vo., pp. iv. and 208, map. (*Dulau*: price 7*s.* 6*d.*)

After a discussion of the received opinions on insular systems, broadly classed as morphological (from their relations to continents) and biological (from their special faunistic and floral peculiarities), the author gives his reasons and authorities for classing the islands of the world as follows:—A,—Tectonic (or independently constructed) islands, divided under the entirely volcanic (with subdivisions presenting no distinct crater, one chief crater, and two or more separate craters), the only partially volcanic, and those having no volcanic formations; B,—Eroded islands, of which five types are recognised, the Norwegian, Swedish, Gotländ, Danish, and British; C,—Islands formed by slow accumulation, either of mineral, vegetable, or animal substances. The map (world, on Mercator's projection) shows these differences by colour; and a good index adds materially to the value of this interesting treatise.

Luze, Édouard de.—La Transcription et la Prononciation des Noms Géographiques Étrangers. Paris (Ernest Leroux): 1883, 8vo., pp. 27.

M. de Luze in 1880 published a detailed work on geographical terminology in different parts of the Globe, and now endeavours, on the simplest rules of common sense in most cases, to reform the various incorrect transliterations of proper names of places that have crept into use. What he chiefly insists upon, is that geographical names should be rendered as nearly as possible in accordance with the pronunciation of the people who originated them; and he considers that, except in the case of languages of a Latin or Germanic origin, the question of transliteration should always be subordinate to that of pronunciation. He lays down the following rules:—1, That the national character of geographical names should be preserved, and that names either gallicised or translated into French should be suppressed as much as possible. 2, That names of Latin or Germanic origin (Italian, Spanish, Portuguese, German, Dutch, Danish, Swedish, and English) should be written conformably with the official orthography adopted in the country to which they belong. 3, That Hungarian, Polish, Chek,

Croatian, Roumanian, and kindred geographical names should be transliterated in accordance with their pronunciation in their respective original countries. 4, That French orthography should be adopted for the geographical names of countries where the Latin alphabet is not in use, and that they should be transliterated so as to render their native pronunciation as nearly as may be. [The apparent clashing of this rule as to the use of French orthography with the first rule, which eliminates gallicised names, is of course to be explained by the fact that M. de Luze addresses himself solely to French geographers and cartographers.] 5, That geographical names of countries in which no written language exists, should be transliterated conformably with the French phonetic system, adopting as a chief base the nationality of the explorers who make mention of them.

As regards geographical terms (distinguished from names of places), the author proposes:—1, To suppress all of a foreign nature as well as all abbreviations of the same meaning, and to substitute throughout the corresponding French terms (this would affect all words signifying valley, mountain, lake, range, river, island, &c.; but such expressions as pampas, jungle, steppe, savana, &c., are proposed to be retained, because they have no French equivalent, and a hope is expressed that Chott, Sebkha, Hamada, &c., may be adopted for the minute physical conditions which they respectively represent). 2, To retain certain geographical terms in parenthesis, accompanied by some qualification, and preceded by a French translation of their meaning.

Some general rules for transliteration of the Latin and Germanic languages are given in the Appendix.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Mittel-Europa, Courskarte von ——. Geograph. Institut, Weimar. 3rd edition. 9 sheets. Price 9*s*. (*Dulau.*)

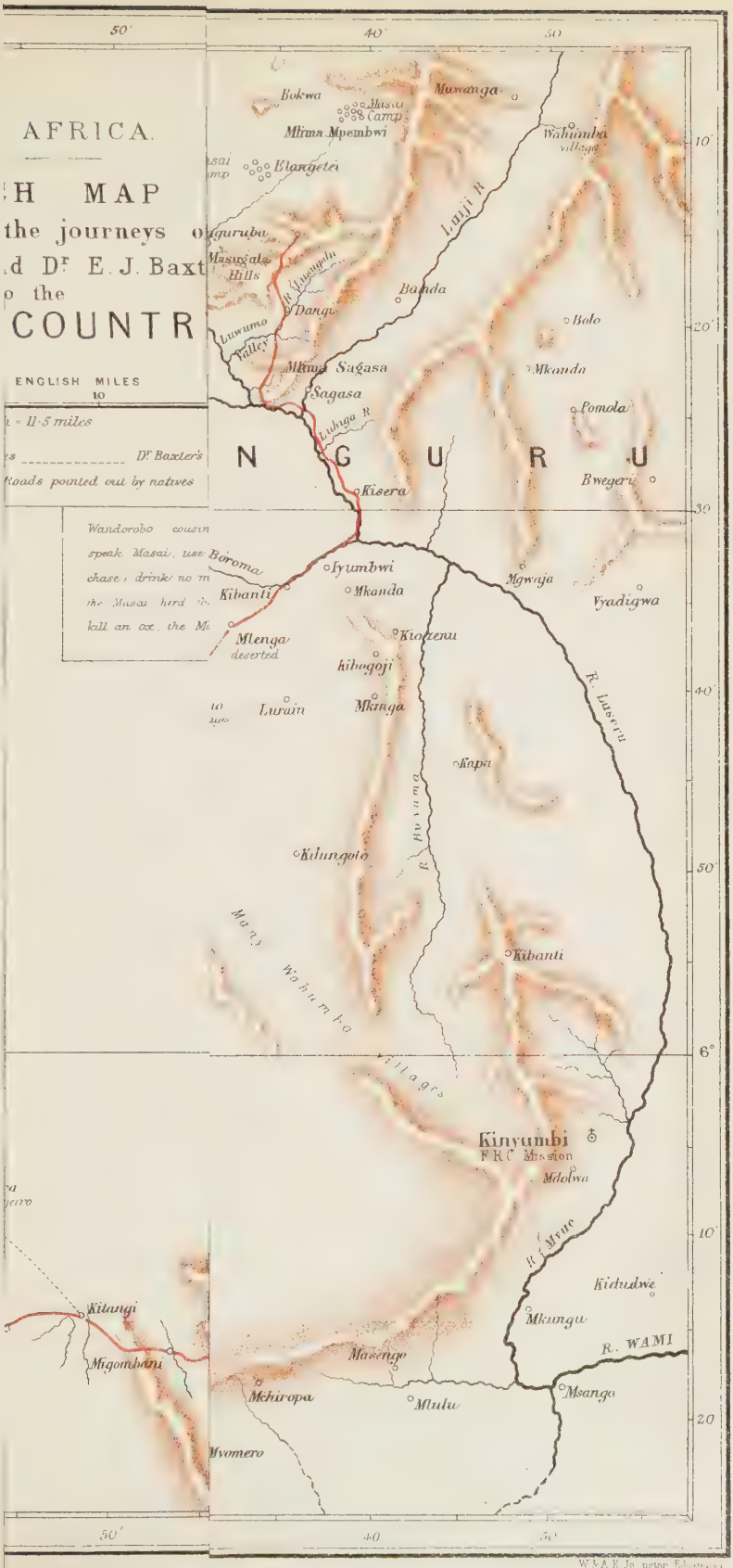
Niederoesterrsteirischen Grenzgebirge, Special-Touristenkarte der——. Von G. Freytag. No. 1. Hochschwab, Hochkohr von Weichselboden bis Eisenerz. Scale 1 : 50,000 or 1·4 inches to a geographical mile. Artaria & Co., Wien. Price 3*s*. (*Dulau.*)

Oder, Uebersichts-Karte der——, von der oesterreichischen Grenze bei Annaberg bis unterhalb Stettin. Im Auftrage des Herrn Ministers der öffentlichen Arbeiten bis Schwedt, gezeichnet und herausgegeben von der Königlichen Oderstrombau-Verwaltung zu Breslau. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sect. 1 Ratibor. 2 Kosel. 3 Oppeln. 4 Breslau. 5 Steinau. 6 Glogau. 7 Neusalz. 8 Krossen. 10 Kuestrin. Trewendt, Breslau. Price of each section 1*s*. (*Dulau.*)

ASIA.

Corea, Map of——. Corrected by Mr. Rondo-Makoto, Vice Director of Study, Imperial Japanese Naval College, Tokio. Scale 1 : 2,000,000 or 27 geographical miles to an inch. Japanese characters.

Tibet und zum Kuku-Nor, Przewalskis Reise durch die Gobi-Wüste und den Kwen-Lun nach——, 1879 und 1880. Scale 1 : 3,500,000 or 47·6 geographical miles to an inch. Reduktion der Original-Routenkarte in 1 : 2,000,000. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 9. Justus Perthes, Gotha. (*Dulau.*)



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AND MONTHLY RECORD OF GEOGRAPHY.

A Visit to Mr. Stanley's Stations on the River Congo.

By H. H. Johnston.

Map, p. 632.

In the month of November 1882, I arrived at the mouth of the Congo, with the intention of spending a few weeks on the river, for the purpose of studying its natural history. I had previously passed a very pleasant time in South-West Africa with Lord Mayo, who had invited me to go with him to the river Cunéné. I remained about a month on the Lower Congo, and then went to pass a few days with a member of the Baptist Mission at Underhill, a pretty little station higher up the river, about 35 miles from Boma, and from here I contemplated making a short expedition into the interior. I had just engaged some men, and bought cloth and beads to pay my way, and was preparing to start, when the chief of Vivi, the first station of the Belgian International Association, sent me an invitation to come over and see Mr. Stanley, who had just arrived from his brief visit to Europe. I went there, and met with the kindest possible reception, not only from Mr. Stanley, but from all the Europeans who were with him. I spent a very enjoyable evening, and left with regret the following day. Mr. Stanley advised me to give up my expedition on the opposite bank, telling me I had not sufficient men or resources for such an undertaking, and offering to start me off into the interior along his road, but I thought I would see how far I could get along the south bank, which had been little visited, and, in case of failure, return to Mr. Stanley and accept his kind offer. Accordingly, on the afternoon of the day on which I quitted Vivi, the 19th of December, I started to walk from Underhill to Pallaballa, with five men to carry my luggage—five rascals, as they turned out, but they were all I could immediately procure in the neighbourhood.

Leaving Underhill, I first toiled up a steep and stony hill, most exasperating in character, my feet slipping back at every step off the sharp-edged stones. Then, as Underhill vanishes behind, shut out by the brow of the hill, a fresh stretch of the river Congo, rolling swiftly

along through narrowing banks, comes into view, with Vivi rising high above its north bank, a crest of white houses surmounting a scarped red cliff. The road winding down from this eagle's nest to the river's side is seen very distinctly. The stream of the Congo here is of immense depth (90 fathoms), and in the rainy season flows at the rate of nine miles an hour; but, to any one not knowing this, it is hard to believe this river, 500 yards broad at most, is the same stream as the great Luālaba.

As one descends the valley the river finally disappears from view. It is flowing nearly northwards, and we are going due east. We pass through two or three native villages of a comfortable and prosperous appearance, and suggesting here and there by certain cunning shifts and contrivances that their inhabitants are not bereft of *savoir vivre*. There are well-cultured plots of maize and cassada, here and there a lime, and even an orange tree (these latter rare), papaw trees, and the beautiful passion-flower, which gives the fruit known as maracujà, or grenadilla, is carefully trained over a framework of sticks. Little plots of ground are being assiduously hoed, and are marked out with geometrical accuracy by means of the same device as our gardeners employ at home—a tight string tied from peg to peg—only that in this case a sort of bast is used instead of string. There are clucking fowls with small chicks about them, carefully housed in large hencoops made of withes and grass, to protect the chickens from their many enemies. In a rough sort of shanty, constructed principally of overlaid palm-fronds, the goats and sheep (the sheep are of the usual Central African stock, with short hairy coats, supplemented in the ram by a splendid silky mane from his chin to his stomach); and even, rarely, one may see a black, high-shouldered bullock stalled in a not ill-fashioned manger made of the same material.

The houses are well and neatly built, generally raised a foot above the ground on a platform of beaten earth. There is first of all a framework of stout poles, one very long pole forming the apex of the slanting and wide-spreading roof—and on this is fixed a covering of thin laths and dried grass. The roof extends some feet beyond the body of the house and, in front, is prolonged to a sort of verandah, further supported by two extra poles, and susceptible of any modification, from being the shady space of a few feet, where the inmates of the house pass most of their time, to becoming the great reception-place and palaver-ground of kings. Here, as we pass, the inhabitants of each house are nearly always assembled. The women look up from pounding palm-kernels and show all their teeth in a grin at the "Mundélé" (white man); the men, squatted in lazy ease, take their large-bowled pipes from their mouths and call out a salutation, generally "Mavimpi"; whilst, irresolute between the threshold and the interior, large-headed, round-eyed children mutely and distrustfully regard the white man, who must embody as much in their eyes some notion of uncanny bogyism as the traditional "black man" does to English children.

Around each village will be a grove of bananas or plantains, a perpetual source of food-supply to their cultivators. There are principally two sorts of fruit eaten here: the plantain, which has no sweet taste, but is delicious roasted and eaten with butter, and the richly-sweet banana.

The style of scenery on the road to Pallaballa is typical of the cataract region of the Congo. A succession of stony hills covered with rough grass, and rich fertile valleys, with luxuriant forests and running streams in their depths. About midway to Pallaballa you have to cross by means of a native ferry the river Mposo, a rapid stream that rises near San Salvador. Beyond this it is all up hill and down dale, till at length we see a fringe of forest, which marks the site of Pallaballa, on the crest of a great hill 1600 feet high. As I pass through the native village the people all cry out "Mundélé, mundélé," and several come forward and salute me with "'Morning," a contraction of "Good morning," which they have learnt from the missionaries. The missionary of the Livingstone Inland Mission, who was resident at Pallaballa, gave me a very kind reception, and a dainty and welcome meal was soon prepared. There were delicious fried bananas, pounded pea-nut sauce with roast chicken, "palm-oil chop," and many other native dishes, supplemented with European luxuries. After dinner the missionary asked me if I would object to attend prayers. I of course replied "Certainly not," and followed him to the school-house, where Miss Spearing, a lady missionary, was residing. Here some twenty people are assembled, principally boys. There is a little giggling at my presence, otherwise they are well-behaved. The missionary prays in *Fiote* (the language of the country) and in English, and also reads a chapter of the Bible in the same tongues. The subject in Fiote is generally badly chosen, being wearisome records of Jewish wars, where familiar sounding Bible names are strangely mixed up in unintelligible Fiote. All the while the black congregation (swelled this evening by my five porters) sits stolidly unmoved, although the missionary strives to infuse the greatest interest into the slaughter of the Canaanites. After this follows a Moody and Sankey hymn in Fiote, in which I feel anything but at home, and can only make semblance with my lips to be following. Finally, a short and fairly sensible prayer finishes up the whole, and then begins a ceremony which the natives would not miss for the world. Each one comes separately and shakes hands with the missionary, Miss Spearing, and myself, accompanying the shake-hands with a "goo' night, sir," applied indifferently to either sex. We also retire to our rooms, and although mine is rather damp (there is a fine crop of mushrooms—alas! not edible—and waving grass growing on my bedroom floor) I have a comfortable bed and sleep well.

My succeeding journey as far as the river Lulu, which, owing to the rapacity of the natives and the robberies of my own porters, was unsuc-

cessful in its results, I will pass over, and give instead a few notes on Pallaballa and the manners and customs of its inhabitants. I do this somewhat in detail, as once you describe one Lower Congo village you can pass over the rest without mention ; they are so much alike between Vivi and Stanley Pool.

It is very damp at Pallaballa. Every morning and evening a thick mist surrounds everything and renders the place clammy and unhealthy. There are four kings in this neighbourhood, Kagumpaka, Nikiangila, Tantia, and a small boy, whose name I forget. Kagumpaka is the head king and only owes allegiance to the king of Congo at San Salvador. A little while ago one of the queens of this king of Congo made a sort of progress through his dominions and was received with great respect at Pallaballa. There are decided traces of Portuguese influence here, and many words of that language are introduced into the local dialect. At Pallaballa the natives are disposed to be impudent and even aggressive towards white men. They are very superstitious, and, for every person that dies, somebody is made *ndokki* (or "devil-possessed"), and has to take the *casca* poison. This is usually administered in such a way as to be merely a strong emetic, under the idea that the victim may "bring up" the devil and cast him out with his bile. They think a great deal of their *Inkīmba*, and woe to the white man who shall offend them. When the Inkīmba are on the road, they announce their coming by a sort of drumming noise like *dur-r-r-r!* and then all who are not initiated into their mysteries must clear out of the road. A young missionary who refused to give way to these fanatics was seized and badly treated. The Inkīmba are in all probability males undergoing circumcision and an initiation into the rites of marriage. They may be of any age, boys of 11 or men of 40, but generally the Inkīmbaship is undergone by young men.

For one native year (six months) the ceremonies last, and there are three or more stages of initiation, said to be marked by changes in their grass coverings. They chalk themselves all over a ghastly white with some argillaceous earth, and do not wash once during their six months' probation, though they often renew the white colouring. They are taught a different language by the *nganga*, or medicine-man, which language appears to be quite different from the ordinary tongue, and is *never* taught to *females*. During the whole period of their initiation they live like the lilies of the field, being sustained at the common expense of the village or community. They renew their hideous white colour every few weeks, and it is a great ceremony with them. An Inkīmba in a shower of rain is a dolorous spectacle. No one has yet been able to examine into their sacred tongue. Might it be some original and more archaic form of Bantu language conserved for religious purposes, like the Sanscrit, the old Sclavonic, and the Latin?

The Inkīmba also receive a new name when they pass through the

mysteries, and it is a great offence to call a man by the name of his childhood only, though one may join it to his new name for purposes of identification.

The people of Pallaballa may be said to "patronise" Christianity. When the missionary holds a Sunday service in king Kagumpaka's house, some twenty or thirty idlers look in, in a genial way, to see what is going on, much as we might be present at any of their ceremonies. They behave very well, and imitate with that exact mimicry that only the negro possesses, all our gestures and actions, so that a hasty observer would conclude they were really touched by the service. They kneel down with an *abandon* of devotion, clasp their hands and say "Amen" with a deep ventral enthusiasm. The missionary gave a short sermon in Fiote, marvellously expressed, considering the short time he had been studying the language. The king took up constantly the end of some phrase and repeated it with patronising interest after the missionary, just to show he was attending, throwing meanwhile a furtive glance at his wives, who were not pursuing their avocations with sufficient diligence outside. A short prayer concluded the service, and when the king rose from his knees he promptly demanded the loan of a handscrew to effect some alteration in his new canoe.

Round Pallaballa the vegetation is very rich. There is beautiful forest in the valleys, pine-apples grow wild, and a fern similar to the bracken gives a familiar air to the woodland glades. The Cucurbitaceæ are very noticeable here; particularly one species that has most gorgeous fruits. They are egg-shaped, about the size of a pear, and covered with prickles; the outside is the most brilliant orange colour; when ripe, the husk splits into four sections, displaying the interior, where the black seeds are lying enveloped in pulp of the richest crimson hue I have ever seen in nature. The commonest birds round Pallaballa are the grey parrot, the *Gypohierax* vulture, and a small black hornbill.

I returned to Vivi on the first day of the new year, and began to make active preparations for my departure up the Congo. Mr. Stanley had fitted me up with everything likely to make my expedition successful, and had, moreover, given me three of his pet Zanzibaris, three men whom I found simply invaluable in every difficulty. I left Vivi on the 7th of January to walk to Isangila, the next station, a distance of 58 miles. Our road was continually up and down, over stony hills and into thickly forested ravines, across tumultuous rivers and through muddy marshes. The road was a mere native path, often lost in a morass or untraceable in high grass. The scenery, however, though very similar to that already described at Pallaballa, was distinctly beautiful, and about the falls of Ngoma became positively grand. I reached Isangila in three days and a half, having suffered much from the violent rains. Isangila is a neat little station set on a breezy hill, facing the splendid rapids of the Congo. The journey thence up the river to the next

station, Manyanga, was a distance of 80 miles, accomplished in four days with a little river steamer, now removed to Stanley Pool. The scenery all along the route is comparatively uninteresting. Manyanga is a fine station, well built of locally made bricks, and advantageously placed on the top of a very steep hill. In the native market close by there is abundance of provisions, and 500 eggs may not infrequently be bought in one week if necessary.

There are two roads from Manyanga to Stanley Pool, one along the north, and the other along the south bank of the Congo. The southern road is the most easy and direct, and runs through more amiable peoples than the other, so I chose this route for my journey. I stopped a night at Lutété, the next station, and reached Léopoldville, the great establishment of Mr. Stanley on Stanley Pool, in six days. They were six days of most agreeable travel (the distance was 95 miles), for the road ran through undeniably beautiful scenery, the people were kindly and courteous, and last, but not least, the pathway, which is one of the great ivory routes to the coast, was bordered with masses of pine-apples, whose golden, luscious fruit we ate freely, but fortunately with no disastrous results. Léopoldville, when I first arrived, was not in a very flourishing condition; it lacked the master-hand of Stanley to set matters going more briskly. The stock of European provisions had been too rapidly eaten up, and after a few months of fat living a time of very meagre nourishment ensued. During the three weeks that I first passed there my blood got very poor, and I suffered much from the many ulcers that broke out all over my body. I owe my restoration to health to the kind care of Mr. Comber, a Fellow of this Society, and a member of the Baptist Mission established on Mr. Stanley's ground at Léopoldville. However, although Lieutenant Braconnier could not manage to give me or himself a good dinner, he and his subordinates did everything in their power to aid me in my researches, not only because of the letters I had brought from Mr. Stanley, but because of the natural kindness of heart that characterises most Belgians.

Stanley Pool is a great expansion of the Congo, and is about 25 miles long and 16 miles broad. There are seventeen islands of noteworthy dimension, the largest of which is 13 miles in breadth. But the surface of the Pool is also strewn with sandbanks alternately covered and uncovered according to the season of the year, and there are also many floating islets formed of masses of aquatic vegetation, which are so strongly interknitted by their fibres and roots that a man can stand on them.

The Pool forms as it were a great cup-like basin with a rim incompletely formed by ranges of peaked and picturesque mountains, ranging probably from 1000 to 4000 feet in height. The banks of this great expanse of water offer considerable variety in character. At the northern or north-eastern end, where the Upper Congo enters it through a somewhat

narrow passage, the scenery is very beautiful. High woods rise so steeply above the water that as you sail beneath their shade they seem to mount indefinitely towards the sky. It is a wall of forest. Then almost opposite, following the northern bank, are the "Dover Cliffs," their scarped sides white and glistening, and their crowns being covered with soft green grass. They more resemble, however, the scenery round Lyme Regis, in Dorset and Devon, than the harsher and more rugged cliffs of Dover. Then on both sides of the Pool the shores dwindle down into flat forest land, the encircling girdle of mountains trending off towards the interior, and when you reach Mfwa, or "Brazzaville," the coast is low and nearly on a level with the water. "Brazzaville" is at present merely a little low-lying native village with some half-dozen huts buried in bananas, palms, and thick vegetation. It has little or no advantages as a site for a European station. Nearly opposite is a curious cliff, apparently of red clay, which rises abruptly from out of its flat surroundings about 50 feet above the river. This is called Calina Point, for here a member of the Belgian Expedition, Lieutenant Calina, was recently drowned. The current is terribly swift as it races round this promontory, and is very dangerous to native canoes ascending the stream. Calina Point is in the possession of the inhabitants of a very large native village in the proximity called Kinshasha. They are very adverse to Europeans, and have hitherto refused to allow a station to be built either in their village or on Calina Point. Should De Brazza ever reach the Congo in his present expedition, and succeed in establishing himself at Mfwa, it is rumoured * that he would like to take Calina Point and make it the Gibraltar of the Pool, and then with this fortified post and the station of Mfwa opposite he would be able to close, if necessary, the mouth of Stanley Pool where it commences to narrow into the rushing lower portion of the Congo. Léopoldville, the great central station of Mr. Stanley's expedition, is situated on a commanding height, and not exactly on the Pool itself, but rather on the short bit of navigable river beyond this expanse of the Congo, a little distance from the first fall. As to the falls of the Congo, I might mention that they are nothing but immense rapids, and do not exhibit anywhere a grand descent or cascade of water.

On the 20th of February I left Léopoldville in a large lighter or whale-boat, rowed by a sturdy crew of Zanzibaris, to ascend the river as far as Bólóbó, a large native village about 250 miles beyond Stanley Pool, where the last station of the Expedition had then been founded. My departure was inauspiciously signalised by a downpour of rain that

* Since De Brazza himself left Stanley Pool to return to France some three years ago his Senegalese sergeant, Malamine, arrived at Kinshasha on a mission from him, but the people, although they received him kindly, would not listen to any proposals for receiving a French station in their midst, and they have equally rejected Mr. Stanley's overtures.

was almost exceptional in its force and duration. We had just managed to row as far as Kinshasha, the place I have before mentioned as being somewhat unfriendly towards Europeans, but not knowing this at the time, I yielded to the Zanzibaris' invitation to descend, and whilst the boat was put into a little creek we went up into the village and took refuge in a native house placed at my disposal by the natives. Here the contrast to the raging storm outside was for the next few minutes delicious, for we found perfect dryness and a comfortable bed of matting to sit upon. The other occupants of the house, excepting the many and constant visitors, were a middle-aged man, with his hair *en chignon*, his wife, suckling a baby, whose forehead was ornamented with a band of scarlet pigment, and an old man who might have been a poor, broken-down uncle of the family. There was a wood fire in the middle of the floor, and its smoke was very disagreeable. The house was clean and tidy, and round the walls were ranged many neatly made articles. Long pipes with little bowls, a clarionet, a white mug (these two last presents from the white men); a *marimba;* a collection of skilfully made little pouches of goat-skin, containing I know not what; hippopotamus harpoons, fishing nets, horns, and a multitude of odds and ends only to be classed under that convenient term *et cetera*. I opened my case of provisions, laid the cloth on the bed, and sat down to my frugal repast with considerable appetite. All this time visitors were flocking in; many children, some of them pretty little things, made friends with me, and were wonder-stricken at my ticking watch.

Next day, Feb. 21st, the Pool began to widen out into all its magnificent breadth. There were numberless islands on which the Borassus palm was growing. These palms are extremely beautiful and symmetrical in shape, and the hanging clusters of fruit are bright orange. The vegetation that clothes the shores of the islands is very rich and pleasing in colour; brightened with masses of yellow flowers, lilac-coloured papilionaceæ, and mauve convolvuluses. The beautiful scarlet seed-vessels of a sort of bean form blazing clusters of gorgeous effect amid the tender green foliage. On the many snags that rear their withered branches over the rushing stream many little birds have for safety's sake hung their pendant nests of grass, and there is a continual twittering and fluttering of dainty forms round the gnarled old trunks and whitened twigs. We saw many herds of hippopotami as we passed, nine or ten animals generally going together. They approached the boat with a boldness and confidence that led one to think they had been little persecuted; the natives, however, hunt them assiduously with the harpoon. Indeed, in one creek where the hippopotami were indulging in the uncouthest gambols, we saw a group of men some twenty yards from their prey actively preparing for the chase. The tameness of these huge beasts is wonderful; one could almost fancy oneself in the inclosure of some zoological gardens, and when they opened their huge mouths

from time to time, displaying their glistening tusks, I sought involuntarily for the bun of my childhood to deftly throw into the pink chasm that yawned before me. Flocks of grey parrots flew across the sky, alternately screeching and whistling melodiously. I have seen it erroneously stated that the grey parrot never whistles in a wild state; on the contrary, it does so very sweetly, and with a great variety of note.

The "Dover cliffs" came into sight towards the further end of the Pool, their white sides glistening in the sun. The banks here begin to be festooned with a curious species of palm, apparently a climber. The fronds are prolonged into a long bare stalk, curiously notched. The fronds are alternate; the reason of the notches does not seem to be very obvious.

A little further on the scenery changed a little. On the north, or, more properly, the *western* bank, the high wooded hills continued, but on the other side stretched a flat and sandy woodland, with occasional tiny rills of delicious water, water infinitely preferable for drinking purposes to that of the Congo, which is tepid in temperature, weak-tea-like in colour, and often full of sediment or sand.

We were six days voyaging up the river, which, beyond Stanley Pool, varied in breadth from 600 yards to 1000, before we reached the station of Msuāta. Throughout this distance of about 110 miles only one affluent of any size greater than a mere brook enters the Congo, and this river, which comes from the south-east, has waters of an indigo-black colour that flow for some mile or two side by side with the yellow stream of the Congo without mingling. The northern bank of the river, until Msuāta is reached, is quite uninhabited owing, it is said, to the depopulation caused by frequent wars. Msuāta is one of the brightest and prettiest of all Mr. Stanley's stations, and is fortunately surrounded by very amiable natives whose feelings towards the white men are extremely cordial. We stayed one night at this station to rest ourselves and dry the baggage, soaked by the almost incessant rains, and then started for the mouth of the Wabūma-Quango river (originally called by Stanley the Ibari-Nkutu), where we intended to stop the night in a large Bayansi village. On our way we passed the curious promontory of Ganchū, a long spit of land advancing into the river which seems to alternate between island and peninsula. Here is situated the village of Ganchū, ruled by an important chief of the same name. It was this village that Stanley on his first and celebrated descent of the Congo called "pirates' village," misconceiving the peaceful intentions of the inhabitants. The river Wabūma at its juncture with the Congo is about as broad as the Thames at Westminster. The scenery along its banks is pretty, being mostly rich forest, but it is otherwise unimposing. The mouth of the river is somewhat ill-adapted for navigation. On one side is a long sandbank, on the other a line of rocks, and only a tortuous

passage between, but when these obstacles are passed the navigation is fairly simple and the channel deep. I have ascended this river but a short distance, only some eight or ten miles at most, so that I am unable to give much information respecting it from my own observation, and can merely repeat what I have heard from Mr. Stanley respecting its course and origin. It appears that the main stream, the Wabūma, flows out of Lake Leopold II. (a sheet of water about 70 miles long reaching to latitude 1° 40′ S.), and after running nearly parallel with the Congo for some distance, flows, as it were, a little away from this river, towards the south, and broadens out greatly, as does the Congo in its upper course. Like the Congo, also, this river narrows greatly towards its mouth. It is in this southern bend of the Wabūma that the great Quango from Angola enters it, and after their junction, the two rivers, distinct in colour, the Wabūma indigo, and the Quango a muddy yellow, flow together towards the west and enter the Congo about lat. 3° 20′ S.

The name Ibari-Nkutu given by Stanley to this big river is quite unknown to the natives, and probably arose through a misconception. It is called Wabūma near its mouth, from the tribes of that name who inhabit the shores along its lower course, and this name would generally seem to indicate the stream which flows from Lake Leopold II. The natives know nothing of the Quango, but the large river that Stanley has seen flowing into the Wabūma can only be that stream, judging both from its direction and the volume of its waters. There are one or two small affluents to Lake Leopold II. which may extend this river system farther, and the Levy Hills, marked on Stanley's first map, probably form the watershed between the great Ikelemba and this newly discovered lake.

The large and populous Bayansi village, situated at the confluence of the Wabūma and the Congo, is very picturesque, as seen from the water, a broad lane leading up to a grove of oil-palms and bananas, with compact and tidy-looking houses interspersed among them; but on landing the impression is rather spoilt by the horrible black fetid mud, strewn with decaying offal, that one has to cross. The people of course are assembled to greet us, and the chief is there, clad in a rusty-red garment, and looking not half such a fine fellow as many of his subjects. The people here are a finer looking race than any I have yet seen on the Congo. Some of the men are perfect Greek statues as regards the splendid development and poise of their figures. They have all pleasing faces, because of the good-humour that enlivens their features. Another remarkable point about them is their comparatively great development of hair. Though the hair is curly and crisp, it often becomes quite long, and is twisted and tortured into all sorts of fantastic coiffures. The men wear it in horns, either on the top of the head, or in a pig-tail, or depending on each side of their cheeks; also in a sort of "chignon." The women sometimes just frizz

it up round the head, or comb it out smoothly and strain it over pads in a manner much resembling a style in vogue (chignons) some years ago or they will plait it into an infinitude of little rats' tails, that from their stiffness stand up all round their head in a bristling manner. A red dye, which is got from the bark of a certain tree, probably camwood, is used to a great extent for colouring their nails, and often their bodies and clothes, with a warm tinge of maroon.

I slept the night at the Bayansi village in a comfortable house, divided into three rooms, which might be described as kitchen, parlour, and bedroom.

Passing over many days of voyaging up this glorious river, I will give from my diary a brief description of one of the days spent at Bólóbó, the last of Mr. Stanley's stations, and practically the furthest point which I attained on the Congo.

"*March 7th.*—This morning early, King Ibaka arrived to pay us a visit. After the necessary palaver was over, I asked permission to take his portrait, which was accorded, but he had not the slightest intention of sitting for it, and moved about at will, but I was nevertheless able to get his exact likeness by availing myself of his complete immobility whilst drinking palm wine, during which very strange ceremonies were performed. There is a legend that a king of Bólóbó, long, long ago, in the legends of the Bayansi, was drinking Málafu (palm wine) at his ease, one day, when a leopard stole up behind him unawares, jumped on his back, and strangled him before the king could cry for help. To avoid such a catastrophe in future, the following ceremony was instituted by his successor. Before the king is about to drink, he imposes silence on the people assembled, by snapping his fingers towards them and crying 'Mà.' ('Mà' is an exclamation to call attention to anything—it is used to dogs.) A wife is crouched behind him, a little boy on his left hand. The wife then also calls 'Mà,' and clasps her lord tightly round the stomach with both hands. The little boy covers his face with one hand, and claps the other continually on his extended leg. Then the king, sticking the first finger of his left hand into his throat below the ear, with the right hand raises the glass and drinks. After he has quenched his thirst he passes his hand across his mouth, and then points with his finger in the direction where he next intends to levy war. When he has not any quarrel immediately on hand, he simply points his finger upwards; then snaps his finger, says 'Mà' again, and the ceremony is at an end, and talking is resumed. All these ceremonies he went through carefully whilst he drank the Málafu in our presence. The Málafu here is made from the sap of the Borassus palm. I prefer it to any other.

"In the afternoon I went into a neighbouring town to make a sketch of a house. The natives received me very well, and took great interest in my work: too much interest, in fact, for certain officious friends

among them, in their efforts to keep the course clear, showed an ill-judged severity towards the unwitting persons who came between me and my object. They beat a woman, who beat a boy, who threw a stone at some one else, and soon there was a general row, in the middle of which I thought it best to retire, in case the general excitement which was surging amongst them should be turned against the white man who had unwillingly brought discord into their village with his sorcerish practices of 'scratching images on white cloth with a piece of stick' (*sic*). Indeed, had I doubted as to the propriety of retiring, my hesitation would not have lasted long, for a friendly young man who had in a measure constituted himself my guide, took my sketch-book with an apologetic smile, closed it gently, and taking me by the hand, led me out of the crowd. Fortunately my sketch of the house itself was finished, and I was only obliged to leave incomplete a group of natives in the foreground that I had commenced. I tried to make my retreat seem as little like one as possible, and stopped frequently to play with children and admire the arms and spears of the natives that were closing up behind me. All the same, I felt myself being as politely as possible ejected from the village, and the smiling natives insisted on accompanying me till I was well out of the precincts and on the road to the station. This was the first time a white man had ever entered their village, though it was barely two miles from the station, and as I was alone and unarmed in a village of about three thousand inhabitants I think they treated me exceptionally well."

I left Bólóbó a day or two afterwards and descended the river as far as Msuāta, the station I had previously visited near the Wabūma river. Here I passed six very pleasant weeks painting the scenery and studying the natives, and here I collected vocabularies of three important dialects, the Batéké, the Bayansi, and the Wabūma. These tribes are the principal races on the Congo between Bólóbó and Stanley Pool, but they appear to be comparatively recent arrivals on the river and to have dispossessed or enslaved the former inhabitants of its banks. The Batéké are mere resident colonists from the north-west, between the Ogowé and the Congo; the Bayansi come from the Equator and north-east, and are the great travellers and traders of the Upper Congo. The Wabūma inhabit the river Wabūma (Quango) in its lower course. All these natives are kindly, merry, and courteous in behaviour; with splendid physical development and great artistic power shown in decorating all their utensils and arms. They are very fond of music, and from their five-stringed instruments draw many harmonies of plaintive tone and perfect rhythm. Their artistic designs are often indelicate, although in their language and gestures they have a great regard for decency. Their languages are Bantu of the most thorough character. That of the Wabūma is strangely guttural; otherwise, in many words it offers some resemblance to the Mpongwé of the Gaboon.

The Batéké is more allied to Congo, and the Bayansi recalls in many of its expressions the tongues of the eastern coast. In all these languages there are many words almost identical with the Kaffir, Ki-swahili, and Congo tongues. Zanzibaris can often make themselves understood in conversing with the natives.

On my return to Léopoldville, I again found Mr. Stanley, who had just arrived. I passed nine most agreeable days with him here, going about the Pool in all directions to attend palavers with chiefs that "Bula Matade" (Mr. Stanley) was holding. At last, however, the time drew nigh when we had to separate, Mr. Stanley to commence his great journey on the Upper River, and I to continue on my road back to the coast. I parted from my kind host with much regret, and I can only say that the hospitality that I met with on the Congo from Mr. Stanley and the members of his expedition was almost princely in its character. I must also thank the employés of the Dutch Trading Company and the English missionaries for the assistance and information they afforded me at various times during my Congo explorations.

Returning to Vivi, I made several minor excursions, visiting the falls of Yellálá and certain villages in the neighbourhood. Then as the time for meeting the Portuguese steamer drew nigh, I embarked in a whale-boat with my three Zanzibaris and some supplementary Krumen and rowed down the river to Banana, where I went on board the steamer *Portugal* that had just arrived, and took a regretful leave of the three faithful servitors that Mr. Stanley had lent me, between whom and myself a warm attachment had arisen.

A Visit to the Wa-itumba Iron-workers and the Mangaheri, near Mamboia, in East Central Africa. By J. T. Last.

In October and November 1882 I was able to make two little excursions amongst the tribes living around Mamboia; the first was to the Mangaheri and Wa-itumba tribes of the Sagala nation. These live to the south of Mamboia. The latter tribe is famous for smelting and working up iron into hoes. The second and more important excursion was to the redoubtable Masai, who live near the borders of the Nguru country, an account of which has already been communicated through Sir John Kirk to the Society. The object of the present paper is to give some details of my visit to the Mangaheri and Wa-itumba tribes.

The Mangaheri tribe inhabit a district some 35 miles long by 15 miles wide. It is a mass of mountains and hills with narrow valleys intervening; situated between 6° 20′ and 6° 40′ S. lat., and about 37° and 37° 40′ E. long. The north-western corner of the district is about 12 miles S.S.E. from Mamboia. The highest mountain, Msonghi, is

nearly 2000 feet above the plain. Its top is covered with some very fine timber, hard and suitable for building purposes.

I started for this district on Saturday morning, October 21st, with a small caravan of nine porters to carry my bed and other necessaries. My object in visiting these people was chiefly that I might form their acquaintance and impart to them some Christian truth. Thence I intended, if possible, to go to the Wa-itumba for the same purpose, with the secondary object of examining personally their iron-pits, to observe their manner of digging, cleaning, and smelting the ore, also the process of forging the native iron into hoes, &c. The sequel will show how far I accomplished these objects.

I was accompanied by Malundo, the son of the Sultan of Mamboia, as guide, and Majwala (Dr. Livingstone's boy) as cook. After descending into the valley from my house, we exchanged a few words with the soldiers at the fort (simply an inclosure with a few huts inside), and then passed through a number of gardens belonging to the Wa-nyamwezi and Wa-sagala in the valley. Then we went over some 10 miles of undulating country, the higher parts of which were covered with miyombo trees; the valleys abounded with bamboos. These grow in clumps of from 50 to 400 in each, the clumps being some 15 or 20 feet apart; the length ranges from 50 to 80 feet; the ordinary thickness at the ground is 2½ inches. I am told that the bamboo produces a kind of corn very similar to rice, and is much eaten in time of dearth. After passing these bamboos we came into a little open valley surrounded by hills 150 to 200 feet high; each of these had one or more villages at its summit.

Mgomba, the chief of this district—which is called Kisanga—lives in a good-sized village not far from the road. He is the younger brother of Seid, the Sultan of Mamboia, and holds his chieftainship under him. We made a short halt at his village. He was glad to see his nephew Malundo, as also to give us a good welcome. In the course of conversation I found that Mgomba had travelled about considerably, especially amongst the Wa-gogo, Wa-humba, Wa-yombo, and Wa-zeguha tribes, whose languages he could speak fluently. We stayed for about half an hour, and then proceeded on our journey. We now passed several villages, and every available spot was cultivated with rice, Indian and Kaffir corns, sweet potatoes, pumpkins, beans, tobacco, &c. On leaving these villages we entered upon a district in which a white man had not been before, and so through the whole of my journey until I reached Mamboia again. We had now to ascend the mountains. Here, and at other places subsequently visited, we found the people very timid, and many of them, on seeing us, ran away to hide themselves in the forest. They returned, however, laughing at their own fear, when Malundo called out to them to say who we were.

About 3.30 we reached a small village on the top of the mountain,

near to which, north and south, were two peaks rising some considerable distance above us. At this village, which is called Monyumera, we put up, intending to stay till Monday morning. The chief of the village, Mwamasi, and his wife were absent, on a visit to relatives at Kife, where a marriage ceremony was being celebrated. The people gave me the chief's house to live in, and room was found in the others for my men. After we had rested we passed our time very agreeably in conversations with the natives.

I spent Sunday in visiting the villages round about, of which there are several, and everywhere found ready listeners. I also ascended the two peaks north and south of the village where we were staying, for the purpose of looking over the country.

On Monday we started again. On leaving we descended about two-thirds of the mountain and then skirted along its side for some distance, passing several good-sized villages by the way. We then went down into the valley, where there are some four or five more villages. Here we stayed for about half an hour to rest and inquire about the road. These were the last Mangaheri settlements on our route.

The Mangaheri themselves are a quiet, peaceable people, their general character being timid and fearful. Occasionally a man with more spirit than others arises, and creates a stir amongst the tribe; such a man generally in a very short time becomes the chief of the district. As a rule, each district is a little kingdom of itself, and has to stand by its own strength, for neighbouring districts seldom help each other. When attacked, the men will turn out with a great noise, and fire off their long Tower flint-lock guns without aim, but as soon as one of their number is down they take to their heels like hares. I think this is a characteristic of most East African tribes.

The clothing of these people is rather scanty; still they are in advance of their brethren who live in more secluded districts, for they have advanced out of the skin-wearing stage, and nearly all men and women wear cloth, chiefly a *shuka* (two yards) of calico. If the women wear skins, it is when they are gardening or nursing their children. To make up for their deficiency of clothes, they very frequently anoint themselves with a mixture of red clay and oil (castor-oil or animal fat): this, they say, keeps them warm. Every man is his own builder. Now and then a man is met with who knows something of blacksmith's work. This generally consists in being able to forge hoes, swords, hatchets, arrow-heads, spears, and other articles, some of which are finished off very neatly. I have seen a native able to mortise together a door frame, of course very roughly. The women do most of the gardening. If there is any very rough bush cutting, the men do it. Men and women work together in time of harvest. After harvest is over, the time is chiefly spent in visiting, talking, and beer (*pombe*) drinking. This latter is not a very intoxicating drink. I have seen people sit and drink all day

long, and in the evening they would be only a little talkative. The garden products are the common cereals of East Africa, all of which they are able to obtain in good quantities.

The buildings of these people are of a composite kind. They generally build a good-sized *tembe* first, inclosing with it a large piece of ground like a courtyard. Tembes are built in the following manner: First, the size and position are decided upon, then a row of holes about two feet apart is dug in the ground about 18 inches deep, the whole length of the tembe. Into each of these holes, a crotched post about four inches in diameter is placed, each rising six feet above the ground level. When these posts are set up, another similar row of holes, parallel to and about nine feet from the former one, is dug, and posts inserted as in the former row; a pole as wall-plate is then laid on the top of each row of posts, and the two rows of posts are connected by poles extending from one wall-plate to the other. The spaces between the wall posts are filled in with smaller wood and firmly bound together with a wild creeper used as rope. When the tembe is extra wide inside, another row of posts is set up to support the roof in the middle. After the outer walls are connected by the poles above, the roof is formed by adding a quantity of smaller posts, branches of trees, and grass; then, on the top of all, about two feet of red clay; this is put on dry and beaten down. The spaces and cracks between the sticks in the walls are all filled up with wet red clay. The inside of the room is smoothed off, but the outside left rough. A small doorway, about two feet wide and four feet high (sometimes not so large), is left, and small round holes to look out at. These are generally dirty, dismal houses. I think the ordinary round huts (*misongi*) are much cleaner and healthier; these are so well known that they hardly need a description. After the Mangaheri have arranged and built their tembes, they fill up the inclosed space with misongi; the largest being generally built in the centre, and occupied by the chief. The household utensils are not numerous,—a pestle and mortar, a few fans to clean the corn with, bags, cooking and water pots, one or two stools, and two or three other trifling things complete the list.

As soon as we left the Mangaheri villages at the foot of the mountain, we crossed a small river which comes from Nyangalla and the north side of the Misonghiro Hills. We journeyed on for about half an hour, and then crossed another small stream. This same stream we crossed some three or four times in the course of an hour's march. Then leaving its bed, we went on through the forest till about 11.30 A.M., at which time we reached the river which comes down from Kitangi. Having crossed, we rested for a short time. Formerly this was a populous and well-cultivated country, now there is not a tembe or hut to be seen, but everywhere is overgrown with bamboos and brushwood. From what I can learn, I expect the whole country has been

overrun twice within the last twenty years; first, by Arabs, or rather by people of the coast (Wa-rima) for the Arabs; these made great havoc; they were probably assisted by the Wa-lori, who overran the whole of U-sagala some sixteen years ago, and sold the natives for slaves. The remnant which remained or who ventured to return home have now been driven out by the cowardly Wa-humba. I say cowardly, because if a dozen of them were to meet with a dozen of other men fairly armed, they would not dare to stand up in open and fair fight with them, but if they saw one or two men coming along their path they would all hide in the long grass until they were quite near, and then all would rush upon them with a shout, stab them with their spears, take their cloths, and go their way. This is one way by which the Wa-humba destroys the country wherever he goes. That they are very fierce and bloodthirsty there is no doubt, but there is little or no true bravery amongst them.

After resting for a short time we started again, but unfortunately missed the proper path, for the district having been forsaken it had become grown up with grass and bush. The road we took bore us through two long forests of bamboos, some of which were very long. We went on until we came to a large river of splendid water. It was some 80 yards wide, and running a swift stream of about 18 inches deep. It takes its rise in the Humba Hills, some 30 miles away to the north. After a short rest we again passed through a bamboo forest, crossed a little stream of red-coloured water, passed through a long flat of park-like ground, and then came to the district of Chilúa. Here we found several villages and tembes, but all of them, excepting two, on the summits of two hills, were forsaken and falling into ruin. The owners had been either killed or driven away by the Wa-humba.

The chief of Chilúa, Magole by name, was away when we arrived, but his people, as soon as they saw that our intentions were friendly, made us very welcome, and gave us two large rooms in the tembe for sleeping and cooking in. In a short time Magole came, said he was glad to see us, and then recounted his troubles and losses by the raids of the Wa-humba. He had been to the pits to buy some *mudapu* (cleaned iron ore), and as the fires were already lighted in the *ng'anja* (smelting house) he was not able to stay and talk, but invited me to go and see the work. By his permission I was able to make a sketch of the house and its contents. I may as well describe here the whole process of iron-working, from the time of its being dug until it is worked up into *magembe* (hoes).

There are five ranges of mountains, the highest peaks of which may be some 5500 feet above sea-level, lying between lat. 6° 30′ and 7° S. and long. about 36° 30′ and 37° E. These all trend in a S.S.E. direction, having smaller hills jutting out from the sides at right angles. These are the Humba Hills. There are but few large trees on the mountains except at the springs, tall coarse grass being the chief natural production. The hills jutting from the mountain sides are generally covered with

miyombo trees, excepting in such places where clearings have been made for villages and gardens. Between each range of mountains there is a well-watered valley, varying in width according to the distances the hills jut out from the mountain sides. There is one or more large rivers in each valley, which takes its rise near the summit of the mountains, and is fed by streams rushing down the valleys between the lesser hills. All the water is of a very pure, sweet quality; only at one place, Chilúa, where the water had to be dug for, did we find it brackish. Altogether these mountains form a beautiful, healthy, and fertile spot, which, in the hands of good native graziers and agriculturists, could be made very profitable. There are, however, at this time but few people living here, and they give most of their time to working iron, and almost completely neglect cattle-keeping and agriculture. On this account they are very poor, for though they have to work night and day, all the produce of their labour has to go for food.

From the numerous sites of decayed villages and the many gardens still marked out by the rows of never-dying plantain trees, as well as from tradition, there is every reason to believe that these mountains were very densely populated at some not very remote time. I have been told that the whole of this country and that to the north, including Mamboia and beyond, was overrun by the Wa-lori some sixteen years ago. This would quite agree with the present state of the deserted villages and gardens, both in the Humba and Mamboia Mountains. The natives were driven from their seats everywhere, very many killed; those taken prisoners were sold as slaves to Arabs and others. I think it possible that the Arabs might have been at the bottom of it all, and by the aid of the Wa-rima, incited the Wa-lori to attack the country in order to get slaves. Those who escaped were afraid to return home, so went and lived amongst the Wa-yombo, Wa-nguru, and Wa-zeguha, who, when they found that their visitors had nothing by which to maintain themselves, seized them and sold them as slaves to the Wa-rima, Wa-swahili, and others. By these means, what was once a powerful tribe has now become almost exterminated. Of those remaining, the men are of good height, and strong muscular fellows. This is probably owing to the toilsome work of blowing the bellows and pounding the iron with heavy stones. In appearance they have very much in common with the sooty foundry-men and blacksmiths of our own country, and as the artisan and mechanic at home is generally quicker in perception, clearer in thought, and more ready at wit than the agriculturist, so these Wa-itumba iron-smelters and blacksmiths are far superior to all the surrounding agricultural tribes in acuteness, ingenuity, and banter. These men are almost exclusively engaged in working iron, that is, in smelting and working up the metal into hoes. The first process is digging and cleansing the ore. This work is generally done by the women. On the hill-sides, between the third and fourth ranges of mountains, there are three places where the iron ore is found.

According to report and the cheapness at which hoes were formerly bought, they must have been far more plentiful than they are at present, and iron must have been produced in larger quantities. It is just possible that the natives formerly dug deeper into the earth and so obtained the ore more plentifully. Now it seems the people never dig beyond two feet into the ground, where there is a layer of red clayey sand, in which small particles of ore are found. It produces probably about five per cent. of ore. The workings I visited, judging from the broken nature of the ground, were probably on the site of some very old excavations. A little stream of water, some four gallons per minute, had been brought down in a gutter to the seat of work. Then a series of little pits had been made in a row, each one lower than the other. These were about three feet in diameter and ten feet apart. The water from above was guided so as to run into each of these pits successively, out of one into the other. The sand containing the ore is put into these pits, and washed over and over until all the loose sandy matter has been carried away by the water, and the iron ore and small stones left at the bottom. This is then all collected out of the water-pans into the sun to dry; when dry it is taken a little at a time to a kind of fan (*ungo*), and fanned after the old-fashioned manner of winnowing corn in England; the stones being lighter than the small pellets of iron, they come to the front, and so are separated. The stony part is laid aside, ready for a further cleansing. The iron ore which has been obtained is put away into bags made from the fronds of the fan-leaved or date palm, and is then ready to be sold to those who smelt it. In this state the iron ore is called *mudapu*.

The spot where the mudapu is found is generally considered to be the property of the chief of the district, and he works it with his own people. The ore is sold at the rate of its equivalent in bulk of clean corn. Some of the buyers come a distance of 20 miles or more; these take it home, and the women reclean it by the fanning process, and it is then ready for the furnace.

The next thing is to prepare an abundance of charcoal for the furnace. For this the men of the village go out into the forest and cut down a number of trees of the kind required. These are then cut into logs some five or six feet long, a place is cleared on the ground, grass, small sticks and branches are laid first, then the logs are packed until they have built up a pile some ten feet square and six feet high. This is then lighted and carefully tended until all is reduced to charcoal. When cool it is broken up so that the largest pieces are not more than two inches in diameter. This is then packed in grass in a very clever manner and conveyed home. Some wire-grass, of the kind called *lukoka* (very much like wire-grass at home), is placed on the ground, and the charcoal heaped upon it; then the ends of the grass are drawn together and tied, after which the whole bundle is bound together with a creeping

plant used as a cord. In this manner it is carried home to the ng'anja. The *mudapu* and *makala* (charcoal) being ready, the next thing is to arrange the pipes (*kelwa*) and the bellows (*nuvukuto*). The pipes are made of clay, moulded on a bamboo (*mgwami*). They are about 2½ inches in diameter and five feet long, and have a lip round one end, thus resembling water-pipes made at home, with which, though perhaps they are not so neatly finished, they will bear a very good comparison. The bellows are made of wood, with a tube of the same material; the top being covered with a piece of skin with a stick as handle projecting from the centre. Where these are arranged, there a fire is made in the centre of the pit; as soon as the fire is sufficiently fierce, a double handful of ore (mudapu) is taken, and dropped lightly into the fire, followed by charcoal; when this is fairly through with red heat more charcoal is put on the fire, followed by two double handfuls of mudapu, and this is covered with a little more charcoal. The furnace is now in working order, and about every twenty minutes more charcoal, iron ore, and charcoal are added. The proportion is generally about two double handfuls of iron ore to eight of charcoal. An incessant blowing is kept up from three sets of bellows by a man and a boy at each bellows, where they work in turns. This is maintained from the time the fire is lighted until all the iron ore is put into the furnace. Towards the end of the smelting they diminish the amount of iron ore they put in and add more charcoal. As the heap of iron ore and charcoal increases in size in the furnace, the pipes from the bellows have to be raised so as to be kept just below the surface of the fiery mass. When all the iron ore is melted the furnace is left for about half an hour, after which time two or three earthen pots (*mabiga*) of water is thrown over the mass. The loose charcoal is then removed from around the lump of iron, and a strong cord made of kongi grass is passed round it, with which it is hauled out of the pit and left to cool. In this state the iron is very much like a large lump of blacksmith's "hards." Generally these lumps are from 15 to 18 inches in diameter, and 2 feet to 2 feet 6 inches in length. After being taken from the pit the lumps may be left for any length of time before the process is carried further. Generally a number of lumps are made as a stock to work from. When ready, the lumps are broken up with an iron hammer, made by the native blacksmith, into little pieces, none of them larger than a walnut. This is then resmelted in another furnace which is served with only one set of bellows. A fire of charcoal is made in the pit, when sufficiently hot about two handfuls of iron is dropped in with a little charcoal, when this is melted more iron is added gradually, until about 8 or 10 lbs. have been put in, then this is covered with charcoal and heated until the iron has become a fairly compact mass. When it is well melted, and the charcoal *amongst* the iron consumed, the outer charcoal is poked away with a short green stick, the lump of iron is seized with a large pair of tongs and conveyed

to the anvil, where a man stands ready to pound it together into a square solid mass. The anvil is a large stone, from the appearance of which one might judge it had been used for years. The hammer is a lump of iron about 2½ inches square and five inches long, with a hole in the middle for inserting a handle. The iron is now ready for the blacksmith, who is generally the chief of both the village and the smelting-house.

Though the iron has been smelted twice, it is still very porous, so that the blacksmith has first to heat the lump very hot, then holding it with his large tongs, has to pound it into a more solid mass with a large stone. The spike part of the hoe is then hammered out from one end of the lump, and then the blade from the other part. All the pounding is done with different sized stones, except the last finishing touches. The hoes vary in size, according to the lump of iron from which they are made. The largest are about eight inches across the blade. The hoes are used by inserting the spike through a hole in the end of a handle about five feet long.

All the blacksmith's work is done out in the open air; the smelting is done in a house externally very similar in shape to the ordinary round hut, excepting that the roof is very steep and high. This length of roof is probably for the purpose of giving a good draught to the furnace. The side walls of the house are about five feet high, of sticks and trees, the spaces between which are not plastered with mud but left open so that there may be a free ingress of air. Some ng'anja have the roof sloping down to the ground, but these are not considered so good as the kind just described. The above information (excepting the matter of digging and cleaning, which I obtained up in the mountains where the digging and washing were going on) I learnt by personal observation and questioning at Chilúa, from Magole the chief. He seemed a very intelligent, hard-working man, and well disposed towards strangers. By his kindness I had a house to sleep in, a fowl for my supper, gained the information I wanted, and had some friendly conversation with the people in the tembe, which I trust may be as profitable to them as it was pleasing to me.

At 6.30 on Tuesday morning I and my party started again to go up into the Humba Hills. We had first to descend into a large valley which extends for a considerable distance to the south. We went on for two hours through forest and bamboo groves till we came to a good-sized river of clear water. This was a boon after the horrid stuff we had had to drink yesterday. The river was about 15 yards wide, with a stream flowing rather briskly about 12 inches deep. Having crossed this river, which takes its rise near the north-west end of the central range of hills, we came upon the skeleton of an elephant which had recently been killed; I took its teeth (not tusks) to Mamboia as a memento of the journey. Here there were the marks of plenty of game,

the country being well suited, it being flat, grassy, and without any human inhabitants near. Thence we went on to a village of Makuas, where we rested for about an hour. Thence we went on to a ng'anja and village on the peak of a hill. On our way we passed several ng'anja where the work was going on. The country through which we passed to-day was a little rough in places, but on the whole easy. It was a gradual ascent up into the mountains. On our way we passed many sites of deserted villages and banana trees, which indicated that formerly there were gardens there. There are not many large trees in the whole of the country. Great quantities of timber are used every year as charcoal for the work of the ng'anja, and so by this means the country is kept very bare. There is a lovely valley, through which two large streams of good water flow; if cultivated it would make most fertile and productive gardens. The natives are so few in number, that they are able to cultivate only a tithe of this good land. Their iron work only prohibits them from doing much, as they otherwise might. At the village where we stopped the people were very kind to us, in giving us houses to sleep in and sugar-cane to eat; they were poor, and not able to give us anything else. At this place I had a touch of toothache, resulting, I think, from the use of bad water at Chilúa; I have several times been affected with toothache after using brackish water. This kept me from making myself as familiar with the people as I would have done.

The next morning, Wednesday, we started about 7 A.M. We had a long steep climb up a bare hill with a ng'anja on its top. It took about two hours to reach its top. We were fairly tired when we reached the summit, and glad of a rest. The men of the village were all far away from home burning charcoal; the women were at the iron-pits close by digging and cleaning the ore. Some men had just arrived from a distance to make purchases of ore with corn; the exchange was quickly effected, and then we examined what was going on. There was a chief woman and some twenty others under her, some digging, others washing, cleansing, and fanning the ore. The process has already been described. Here I was able to obtain a little of the sand with ore before washed, and a little of the washed ore. The chief woman objected at first, thinking I wanted to make some kind of witchcraft medicine, by which to destroy the working of her pits, but after a little talk she consented to my request. We then went on climbing up and up until we reached nearly the top of the highest peak. Here we came to a remarkable place called "Tetemeko," *shaking*. It is really a lake or reservoir lying between the *peaks* of two hills. Its length is about three-quarters of a mile, and in breadth varying from 200 to 800 yards. It is covered all over with a great thickness of wire-grass strongly interwoven together, so that one can walk with safety along its edge, although at the same time it dances up and down as if upon a spring. At the end at which we first arrived a stream of water slowly flowed out, beautifully clear,

cold, and good. Away it went rushing down the mountain side, and was lost from our view in a thicket of trees; near the further end and on the opposite side I saw a tree with large lilac-coloured flowers. I essayed to go across to see what they were like, but soon found it was too hazardous a matter. There are several stories of people having lost their lives at this place.

Near by there are a few spots of good ground, but I am told that natives would never build or cultivate there, as the place is looked upon with superstitious dread. Leaving this place, we crossed the crest of the mountain, and began to descend a defile on the eastern side. Here I came upon a fine lot of ripe blackberries, which I did not leave till they were all gathered. Considering the scarcity of fruit in Africa, they were a great treat, but more especially so as reminding one of home. On we went down the mountain side for about an hour, when we came to a little village and a spring of clear water. The natives had here very ingeniously put the whole of this water to very good use. About half a mile lower down the hill there was a ng'anja and village. A ditch had been dug about a foot wide, and the water was guided down so as to supply the wants of the workmen and the village. The gardens between the spring and the lower village were well irrigated, so that at the time we passed there were several acres of splendid green Indian corn fit for use. The spare water was still carried on and irrigated gardens lower down the hill. This is the best piece of irrigation I have seen in Africa. Passing on we came to several villages. The people living here engage in iron work, but give more time to agriculture than those living on the other side of the mountain, and are therefore much better off. We now came to a thickly-wooded country with here and there a clear spot where a village had formerly stood. At last we reached the valley and crossed over a river about 20 feet wide and three feet deep. It was very good water. The valley here is very narrow. We ascended the other side and went on through wooded country for about half an hour, at which time we came to a large village inclosed by a tembe. Here we put up for the night. The natives had not had a European visitor before, so there was, as is usual in a large village, considerable commotion among the younger members of the community; they were, however, quickly pacified. When we were fairly settled some men brought us three loads of good sugar-cane, for which I gave them two yards of cloth. This I divided between my men, the donkey, and myself.

We were up and ready by 6 A.M. the next morning, and having bid farewell to our friends we started for Mamboia. The road was very rough, ascending and descending. At 8 A.M. we reached two large villages, where we rested for a while. Thence we went on over the same kind of rough road until we came to the large village of Futu, who is the chief of all this district. Futu was not at home, but Sanyagwa, another chief, with his own men and some of Futu's came

out to see me; but as Sanyagwa was slightly affected by pombe-drinking I stayed but a short time. Leaving here we descended into the valley, crossed the river which comes from Kitangi, passed over another range of hills, and then descended into the Mamboia valley or plain. This is divided into a number of districts with distinct names; each has a separate chief, who is more or less subject to the chief of Mamboia. At the foot of this last range of hills we entered a kind of basin; the bottom was quite flat, a mile long and a quarter of a mile wide. It was surrounded on three sides by hills, and on one side by slightly rising ground. By its shape and general appearance it looks as if it might formerly have been a small lake. Leaving this supposed lake we went on over undulating ground till we came out at the Wanyamwezi's villages; thence we went on past the fort (so-called) up to our own mountain home, at which place we arrived at about 2.30 P.M.

I have not said much about the social customs of the Wa-itumba, as they differ but little from those of the Mangaheri. There is this difference which I may mention, the Wa-itumba in the mountains do not use tembes as dwellings, but simply build their round huts on the open tops of hills. I may have more to say about their notions of God and religion generally, their social customs concerning deaths, marriages, &c., at some future time.

I think I mentioned in a former communication the remarkable manner in which the East African tribes are broken up, so as to form nation, tribe, and family or house. The Sagala nation: this nation has a number of tribes, of which the Megi is one. The Megi tribe is divided up into houses or families (*kungugu*), of which the Wa-ijumbe (the ruling family) is one and the Wa-isongo is another. Each of these, and of all other families of the tribe, has a distinctive crest (*kolo*), as the lion, buffalo, kite, pigeon, snake, or a certain tree; as the Wa-ijumbe of the buffalo, and the Wa-isongo of the snake. Sometimes a family or house (kungugu) is subdivided, then each subdivision takes a distinctive crest (kolo).

Report on Admiralty Surveys for the Year 1882. By the Hydrographer, Captain Sir Frederick J. O. Evans, R.N., K.C.B., F.R.S.*

The following ships of war have been employed during the year 1882 on surveying duties on foreign stations:—

	Horse-power (Indicated).	Tonnage (Weight in Tons).	Officers and Men.
Steam Vessels:			
Alert—Indian Ocean .. .. [Paid out of Commission September 1882]	310	1240	120
Fawn—Red Sea; Shoal banks in Indian Ocean, Delagoa Bay and South-west Coast, Madagascar.	480	1050	126
Flying Fish—South Coast of Japan, West Coast of Korea	840	940	113
Magpie—East Coast of Japan, South Coast of Korea	600	805	113
Sylvia—Rio de la Plata, Strait of Magellan	690	865	111
Sailing Vessels:			
Renard—Fiji Islands	Schooner	120	28
Sparrowhawk—West Indies (Bahamas)	ditto	86	24 (including 20 hired men)
Lark—Solomon Islands	ditto	180	35

There have also been engaged on surveying operations the hired steam vessel *Gulnare* on the coasts of Newfoundland; and the sailing schooner *Meda* on the coasts of Western Australia, that colony bearing a moiety of the expense. The *Triton*, a new steam vessel, manned with seamen of the Royal Navy, has replaced the *Porcupine* for service on the coasts of the United Kingdom. The hired steam vessel *Knight Errant* has been engaged, as heretofore, chiefly on the west coast of England and east coast of Ireland.

The number of officers of all ranks employed in the several vessels above-mentioned, amounts to 76, and their crews to 582; these numbers are exclusive of the crew of the *Alert*.

Coasts of the United Kingdom.—Early in May the *Triton*, a newly built paddle-wheel steam vessel of 410 tons, and 370 horse-power, was commissioned by Staff Commander Tizard to replace the *Porcupine*, a similar class of vessel, which had been employed for many years in surveying duties on the coasts of the United Kingdom, but now worn out.

During the year that officer and his assistants have re-sounded the anchorage within the breakwater at Alderney; the approaches to Cowes, in the Isle of Wight, and the foreshore of Southsea beach, Portsmouth Harbour. In the estuary of the Thames, Yantlet Flat, Jenkins Swatch, and the edge of Maplin Sand, have been re-sounded, and also the deep water channel "Duke of Edinburgh" (formerly known as "Bullock Channel"), which has been recently buoyed for the use of vessels of large draught frequenting the Port of London.

Off the east coast of Scotland, between Montrose and Kinnaird Head, six sectional lines of soundings were obtained; the soundings being carried to a distance of

* From the Parliamentary Report, May 8, 1883.

100 miles from the shore. This service was executed for the verification of various soundings recorded on existing charts, the authority of which could not be traced, as well as to ascertain the prevailing nature of the sea-bottom, this area being much frequented by fishermen. It has led to the revision of numerous erroneous depths. Temperature observations, both of the sea surface and bottom, were at the same time made, with the general result that while from the shore to a distance of 25 miles, the bottom temperature did not fall more than from 2½° to 4° F. below that of the surface; at the distance of 50 miles, the differences ranged from 2½° to 11° F., and from thence to 100 miles, from 5° to 8° F. The surface temperature over the whole area sounded varied from 52° to 60° F., and the bottom temperature from 46°·5 to 53°·5 F., the surface temperature inshore being, as a rule, lower than that in the distant offing. The bottom for the most part was found to consist of fine sand.

Proceeding northward, several soundings were obtained in the immediate neighbourhood of Fair Isle, off the north coast of Scotland. From the latter part of July until the middle of September, the *Triton* was engaged in obtaining soundings and sea temperatures at surface and bottom, with occasional dredging in the Faeroe Channel: this service was performed at the request of the Royal Society, in continuation of similar observations made in the year 1880, to which attention was drawn in my report for that year. The opportunity was also embraced of testing pressure gauges at a depth of 1400 fathoms, about 100 miles from the north-west coast of Ireland, for the verification of deep-sea thermometers.

Whilst these investigations of the sea temperatures and the distribution of the fauna in the warm and cold areas of deep water in this channel were proceeding (which may now be considered as completed), two gentlemen, Mr. John Murray, F.R.S.E., and Professor Chrystal, of the University of Edinburgh, were, at the instance of the Royal Society, embarked in the *Triton* to carry out, conjointly with the officer commanding, the necessary scientific observations.

West Coast of England.—Staff Commander Archdeacon and his surveying party in the *Knight Errant* have, in Wales, re-sounded Milford Haven seaward of Pembroke Reach (the last examination having been made in 1852–4), together with the approaches to the shore line, extending from Sheep Island to St. Goven's Head. Proceeding to the coast of Lancashire, the entrance to the river Ribble, as also the approaches to the shore, extending from Formby to Fleetwood, have been re-sounded to meet changes in the shoal grounds.

Taking up necessary work on the east coast of Ireland, the approaches to Wexford Harbour, including Wexford South Bay, and the off-lying banks Lucifer, New Ground, Long Bank, and Holden's Bed have been re-examined. Kingston Harbour was also surveyed in detail in consequence of changes in depths.

West Indies.—The survey of that part of the Little Bahama Bank, situated between Elbow Cay lighthouse and Pensacola Cay, commenced late in 1881 by Lieutenant White in the sailing schooner *Sparrowhawk*, is reported to be nearly completed. The progress of this survey was somewhat retarded by the vessel requiring extensive repairs, which necessitated her going to Bermuda.

Newfoundland.—Staff Commander Maxwell and party, in the hired steamer *Gulnare*, have, after some years' constant employment on the west and northern shores of Newfoundland, been transferred to the south coast. The northern portion of Fortune Bay, with its many indentations from Connaigre Head eastward to Eagle Point, together with enlarged plans of Breton and Femme harbours, have been completed in ample detail.

South America.—Rio de la Plata.—Magellan Strait.—The *Sylvia* was commissioned by Captain Wharton in March, and in May left England for surveying operations at the entrance to the Rio de la Plata, and in the Strait of Magellan.

When approaching the coast of Brazil, near the Albrolhos Banks, the lead was kept going in depths varying from 60 to 120 fathoms; this resulted in finding a small coral bank, hitherto uncharted, with 45 fathoms, in latitude 20° 1′ south, and longitude 37° 31′ west. On nearing Monte Video opportunity was taken of verifying the positions of the lighthouses on Capes Santa Maria and Polonio. The survey of the entrance to Rio de la Plata commenced with an examination of English Bank and the extensive shoal grounds stretching from it eastward, westward, and southward; barriers to navigation occupying so much of the entrance to this great estuary. Although operations were retarded by prevalent strong winds, rain and fogs, English Bank and its extensive shoal ground under a depth of three fathoms, together with the shallow Archimedes Bank, have been accurately delineated.

The area sounded over, in extension of the above, amounted to 1100 square miles comprised between 35° 5′ and 35° 40′ south latitude, 55° 30′ and 56° 20′ west longitude. This examination has disproved the existence of many shoal spots reported to the south and also east of English Bank. In the progress of the survey detailed plans were made of the anchorage at Flores Island, near Monte Video, and also of Maldonado Bay.

Leaving the Rio de la Plata early in October, an examination of parts of Magellan Strait, to connect with the surveys of former years, was commenced. In this service the *Sylvia* was chiefly employed near the western entrance of the strait in Sea Reach, completing much of the necessary triangulation, and coast-line to the extent of about 100 miles. Search was made for a dangerous rock, reported in 1881 as situated about half-a-mile to the south-east of St. Jerome Point, between English and Crooked reaches; a shoal of 18 feet, marked by kelp, was found in the fairway, about one mile to the westward of the reported danger, which is doubtless the same.

The surveying work in Magellan Strait was in active progress at the end of the year 1882.

Red Sea.—Delagoa Bay.—Madagascar.—The *Fawn*, under Commander Aldrich, in continuation of the survey commenced in 1881, was engaged in the southern part of the Red Sea during the early months of the year.

The Hánish Islands group having been completed, an exhaustive survey of the off-lying shoals at Mokhá, as also the roadstead, was made, followed by a detailed survey of the Zebáyir Islands. Jebel Teïr was also visited, and soundings taken around it. Some activity was going on in this volcanic island, as hot vapour was observed rising from small fissures and cracks, and sulphur was found on its summit. Several chronometrical distances were measured, connecting Jebel Teïr, Zebáyir Islands, Hodeïdah, Mokhá, with each other and with Aden:—Aden itself being connected in longitude with Greenwich Observatory by electric telegraph.

Leaving the Red Sea early in May, the *Fawn* proceeded to Mauritius, and on the passage carried a line of soundings in addition to the work of 1881, across the south-eastern edge of Saya de Malha Bank. Mauritius was reached early in June, and after a few days' detention for the purpose of being docked, the vessel arrived at Delagoa Bay towards the end of the month. Taking up some of the useful work commenced in 1881, Cockburn Channel, the main south entrance into Delagoa Bay, was closely sounded, and also a part of Port Melville; search was made for the Natal and Assyria shoals within the bay, but without success; Natal Shoal has been expunged from the chart. The coast-line of Elephant Island with the north part of Inyack Island, was accurately charted, and connected with Reuben Point Lighthouse at the Portuguese settlement of Lorenzo Marques. In the offing, Danae Reef was examined and its position accurately determined in relation to Cape Inyack.

Proceeding to Simons Bay, Cape of Good Hope, the vessel underwent a thorough refit, preparatory to embarking the instruments and astronomers sent from England

to observe the transit of Venus, in Madagascar. Leaving the Cape early in October on this service, the ship anchored off Natal for the purpose of comparing her chronometers by electric telegraph with Cape Town Observatory. St. Augustine Bay, on the south-west side of Madagascar, the place selected for observing the transit, was reached towards the end of October, and after establishing the observers with all the requisite appliances on the small island Nos Vey, a survey of the locality was commenced. This survey embraced the southern approach to St. Augustine Bay, including Nos Vey, and its friendly anchorage taken up by the *Fawn* for the purposes of the transit, it thence extended to the south entrance of Tullear Bay.

On the completion of the necessary astronomical observations connected with the transit of Venus, the *Fawn* sailed immediately for Natal, to again obtain chronometrical comparisons with Cape Town Observatory, in order to determine with the greatest possible precision the meridian distance between that observatory and Nos Vey. Commander Aldrich reports that this expedition in the interests of astronomical science was highly successful, the transit having been observed under favourable conditions of weather by the astronomers, the Reverend Fathers Perry and Sidgreaves, of Stonyhurst, and also by himself:—likewise that the longitude of Nos Vey by the chronometric measurements from and to Natal has been determined with marked precision.

On return to Simons Bay at the end of December, the astronomers were disembarked to proceed to England by mail packet; the *Fawn* shortly afterwards sailed for England to be put out of commission, her boilers, after several years' wear, having become unserviceable.

Indian Ocean.—The *Alert*, Captain Maclear, left Singapore, early in February, for Colombo and the Seychelle Islands. Reaching that group early in March, the position of the off-lying Bird Island was determined in latitude and longitude, doubts having been raised as to the accuracy of its charted position.

Having rated chronometers at Mahé, the *Alert* proceeded to the Amirante Group of islands, running a line of soundings across the extensive Seychelle Bank. The month of March was devoted to an examination of these islands, the entire group being accurately charted, and the banks of soundings on which they rest delineated to the one hundred fathom edge. Returning to Mahé early in April to coal, and rate chronometers, the ship then sailed on her homeward voyage, further soundings having been made on the Seychelle Bank, in parts hitherto blank on the charts.

Alphonse Island was next reached, but as a safe anchorage could not be found, its position alone was determined. Providence Island was then visited. This small coral islet, two miles long, and one-third of a mile in breadth, is on the north end of a coral reef, 23 miles in length, level with low water; on the southern part of this reef several sandbanks, about six feet above high water, serve to mark the danger. The western side of this extensive reef was charted, and the soundings carried out to a depth of 100 fathoms, but the heavy sea on its southern and eastern sides prevented further examination. In connection with Providence Island, Wizard Reef, and the small island of St. Pierre, situated respectively therefrom 23 miles northward and 18 miles westward, were each accurately determined in position. From St. Pierre the *Alert* proceeded to Glorioso Islands. Five days were spent in making a detailed survey of this group.

These several islands visited by the *Alert*, which are dependencies of Mauritius, are now for the first time accurately connected with each other, and with Seychelles, Mauritius, and Mozambique. The islands permanently inhabited in the Amirante Group are Poivre, Ile des Roches, and D'Arros, upon each of which the coco-nut is largely cultivated; the other islands of this group are chiefly visited from Seychelles for turtle and fishing. Alphonse and Providence islands are inhabited; as is also

Glorieuse in the Glorioso Islands. This latter settlement, it is said, is about to be abandoned.

Touching at Port Mozambique to rate chronometers, opportunity was taken to make a partial examination of the entrance to the harbour and of Leven Bank; as also to determine the positions of the several buoys marking the shoals of the Port. Leaving Mozambique at the latter end of May, the *Alert* then made the best of her way to England, calling at the Cape of Good Hope to undergo slight refit, and reaching Plymouth Sound on 3rd September, 1882, after an absence of nearly four years, employed in active surveying work.

Western Australia.—The surveying schooner *Meda*, successively under Navigating Lieutenant Dixon and Staff Commander Coghlan, has performed useful service during the year in sounding the approaches to the shore line of the colony, between Champion Bay and Cape Leeuwin; and in defining the edge of soundings to a depth of 100 fathoms, also in clearing away reported dangers on this line of coast, hitherto a source of embarrassment to seamen.

In the track of vessels between Fremantle and Champion Bay, the Turtle Dove Shoal was closely examined, the least water found being five fathoms; the position of the neighbouring Pelsart Bank with 18 fathoms was also charted. The sea breaks heavily at times on Turtle Dove Shoal, and a heavy swell was experienced on Pelsart Bank. Near Cape Leeuwin the formidable "Rambler" Reef was closely searched for, and its non-existence definitely proved. This bugbear to vessels rounding that prominent Australian headland has therefore been expunged from the charts.

In continuation of the work of previous years, Beaver Reef, about 60 miles westward of Swan River, was again searched for, and eleven days occupied in traversing over and near the reported position. As the area of search in the five several examinations now made has embraced 20 miles of latitude and 60 miles of longitude; and, further, no bottom having been obtained at depths varying from 300 to 850 fathoms, this reported danger has been removed from the charts.

From the increasing importance of the Gascoyne district, and the limited information concerning its sea-board, Navigating Lieutenant Dixon was detached in May to accompany a land expedition to that region, in order to report on the anchorage at the mouth of Gascoyne river. This officer made a complete plan of the anchorage, including the mouth of Gascoyne river. He also examined the inner and outer bars of False Entrance to Shark Bay. This service, which was exposed and arduous, occupied several weeks.

Japan.—Corea.—The *Flying Fish*, under the command of Lieutenant Hoskyn, after employment in continuation of former work on the coast of Kiusiu in Japan, eastward of Van Diemen Strait, proceeded in May to that part of the west coast of Korea in the immediate neighbourhood of the capital town, Séoul.

Consequent on a preliminary treaty of amity and commerce which had been arranged between British and Korean authorities, the anchorage of Jinchuen (or as it is sometimes rendered under the names of Inchön, Ninsen, Ché-mul-pho) on the mainland, but forming a part of what is known as the Salée river, was, on account of its proximity to Séoul, examined as likely to be a desirable port for trading and settlement. This anchorage is distant from Séoul about 23 miles by a fair and generally level road leading direct from Ché-mul-pho (the landing place). Another anchorage on the mainland, a few miles to the south of Jinchuen, apparently known to and frequented by Chinese vessels (and lately in occupation of Chinese forces) is known as Masanpho. This anchorage, when seen at time of high water, presented a favourable appearance as a port, and was accordingly surveyed; it was found, however, to be so contracted by mud flats as at low water to be unsuitable.

Lieutenant Hoskyn reports on this examination, that although Jinchuen has

many disadvantages, the chief arising from the great strength of the tides, and the difficulty in landing at low water from the great extent of soft mud then left uncovered,—serious defects common more or less to all the anchorages in this locality,—there is no place in the neighbourhood of Salée river which would answer the requirements of an open port equally well as Jinchuen. The approaches to Salée river from the Yellow Sea are through a labyrinth of islands (one of these groups is charted as Prince Imperial Archipelago); the outer islands of this group are 50 miles distant from Jinchuen. At present we know little of the nature of the outer channels leading to that port, but from the great range of the tides (22 to 30 feet) and their velocity, the multitudinous islands in the offing, and the extensive shallows facing this singular line of coast, the seaman, even after surveys have been executed, will doubtless require to exercise much caution in approaching the mainland of Korea in the neighbourhood of its capital.

The examination of the approaches to Salée river was continued to the middle of November; this service embraced the survey of Sir James Hall Group to the north-west, in addition to elaborate plans of Jinchuen and Masanpho. Whilst employed in this service material assistance was rendered to the Japanese Embassy. That body, owing to serious political disturbances, having been driven out of Séoul, fortunately reached the *Flying Fish*, and were conveyed in that ship to Nagasaki.

Lieutenant Hoskyn describes the country in the neighbourhood of Jinchuen and Séoul as having a poor and sterile appearance, and being thinly inhabited. The higher hills are generally destitute of trees, the lower elevations clothed only with a stunted fir, chiefly grown for firewood. The intervening valleys are cultivated apparently in a negligent manner, and compare unfavourably with the carefully tended crops in Japan and China. The walled city of Séoul (or Söul) is reported to have a population of 240,000; it stands between the mountains, about two miles from the right bank of the river Séoul or Han Kong; here the river is from 200 to 300 yards wide, very shallow and full of sandbanks, and appeared to be above the influence of the tide. The wall (of substantial appearance) encircling Séoul, is from 10 to 20 feet high, and 10 or 12 miles in extent; it traverses on the north a height of 1130 feet, and in that direction the city is overlooked by a barren and rugged range, which attains an elevation of 2700 feet. The two principal entrance gates are on the east and south; a wide street, the main thoroughfare, divides the city into two nearly equal parts. In the northern part are the king's palace and residences of the nobles. At the time of Lieutenant Hoskyn's visit, the Chinese had fortified camps outside the gates.

After leaving Korea the *Flying Fish* resumed the survey on the south-east coast of Kiusiu, and completed in detail the part between Odomari Bay, near Sata-no-misaki, and Kayeta Saki, including a separate plan of Abratsu Harbour.

China.—Japan.—Korea.—In the commencement of the year the *Magpie*, under Lieutenant and Commander Carpenter, on the completion of the shores of Hainan Island, and on the passage thence to Hong Kong, delineated the Nau Chau banks, and about 30 miles of the Kwang-tung coast-line.

After refit at Hong Kong, the *Magpie* proceeded to Japan, obtaining deep sea soundings on the passage when the weather permitted. Surveying operations were commenced on the east coast of Nipon, and that part between Mela Head, at the entrance to the Gulf of Tokio, and Ohigasi-Saki (a coast, it is to be observed, frequently enveloped in fog) examined in detail; as was also the salient point of Inaboye Saki, to the north-east of Ohigasi, soundings being carried seaward to a depth of 100 fathoms.

In July, as resulting from the treaty recently made between the British and

Korean authorities, the *Magpie* commenced an examination of that part of the south coast of Korea Peninsula extending from the Japanese treaty port of Fusan in the south-east, westward to Herschel Island, a distance of about 90 miles. Much of this sea-board region was heretofore unknown. The coast-line, which is skirted with mountain ranges, in places attaining an elevation of nearly 3000 feet, is broken up into numerous gulfs and deep indentations, crowded with islands. Among these are to be found several accessible harbours and useful channels. The mouths of the rivers, and their beds, in the neighbourhood of the coast, were all shallow. Although the soil is reported as good, and the climate excellent, the country is but poorly cultivated. In the progress of the survey the native officials were at all times civil. The lower classes were observed to be poor, and living in a squalid condition.

On the line of coast examined, Douglas and Ashby inlets of existing charts were surveyed in detail. Douglas Inlet (now named Sir H. Parkes Sound) was found to extend in a north-westerly direction 19 miles, and studded with small islets. Ashby Inlet proved to be the embouchure of Naktong river, said to be navigable for small vessels of six to eight feet draught. Willes Gulf (hitherto unexplored) was examined; its upper part is blocked with mud-banks deposited from the river Sapoo. A large and probably navigable sound, with an area of some 180 square miles, lies to the westward of Willes Gulf, and can be entered either from the head of that gulf or from the passages north-east of Herschel Island. Among the useful harbours to passing vessels is one on the east coast of Cargodo Island, and another small and secure one in Observatory Island.

The tides on the coast visited were not so strong as those experienced on the west coast of Korea, and their range was much less, not exceeding 10 or 12 feet. The numerous inlets, and the coast generally, were likewise comparatively free from the mud-flats and shallows which form so serious a barrier to the west coast approaches.

Western Pacific Ocean.—In consequence of the defective state of the sailing schooner *Alacrity*, Lieutenant Richards and party were transferred in January to the sister vessel *Renard*, and in April resumed the survey of the Fiji Islands.

In continuation of the work performed in the preceding year, a portion of the northern coast of Viti Levu, including Malake Passage and the off-lying danger, Charybdis Reef, was examined. Thence, the north-western shores of Vanua Levu, from Ruku Ruku Bay, eastward to the meridian of 179° 8′ E., including the intermediate islets and reefs, with Kia Island completed. A partial examination was also made of the off-lying reefs and dangers in the vicinity of Round Island. The channel between Viti Levu and Yendua Island has been partially sounded, as also the channel north of Yendua, between Round Island and Vanua Levu. That part of the east coast of Viti Levu between Ngoma Island and Verata Point was also completed.

The *Lark*, sailing schooner, specially built for surveying service in these seas, under Lieutenant Oldham, commenced operations at the Solomon Islands early in April. During the year a portion of the eastern shores of San Christoval has been charted; and the channel between San Christoval and Ulaua partially sounded. A plan of Eddystone or Simbo Island, with the off-lying reefs, was also executed. Princess Islet and Bridgewater Reef, reported to exist to the south-west of Rendova Island in the distant offing, were searched for, and existence disproved,—they have been expunged from the charts.

The Rua Sura Islands, situated near the eastern side of Guadalcanar, were visited, to render assistance to the crew of the wrecked ship *Pioneer*: a sketch survey was made of the anchorage at, and the reefs around, this small group. As forming a groundwork for future operations, the positions of Port Mary in Santa Anna Island,

the south end of Three Sisters Islands, Ugi Island, Mboli Harbour in Florida Island, Eddystone or Simbo Island, and Blanche Harbour in Treasury Island, were accurately determined by star latitudes, and chronometrical meridian distances, in short intervals of time.

The *Lark* reached Sydney early in December to refit.

India.—Consequent on changes effected during the year in the constitution and management of the Marine Survey of India, Commander L. S. Dawson, R.N., employed under the orders of the Indian Government, assumed in July the executive charge of the surveys in progress; his staff including three officers of the Royal Navy (Lieutenants Channer, Coombs, and Navigating Lieutenant Pascoe).

Commander Dawson, in sending under official arrangements to the Admiralty the results of the surveying operations on the coasts of British India, for publication, informs me that in the *Investigator* (an efficient paddle-wheel steam vessel of 580 tons, specially built and equipped by the Indian Government for this service) he has charted that part of the West Coast of Hindostan comprised between Malwan and Vingorla, including the Karil Kachal Passage, Vingorla Rocks, and the several dangers in that locality. Detailed plans on a large scale of Malwan Bay, with its approaches, also of Vingorla Roads, had been made in the early part of the year.

On the completion of this service the *Investigator* proceeded to the Bay of Bengal, carrying a line of deep soundings from Vingorla to Colombo. In the Bay of Bengal, Dhumrah river, including the off-lying Palmyras Shoals, was surveyed, from its entrance to Chandballee, to be followed by that of Balasore river and neighbourhood. As considerable changes were reported to have taken place in the outer bar of Chittagong river, a detached party, in the fall of the year, under Lieutenant Coombs, re-sounded and delineated the banks at its entrance. A detached party from the *Investigator*, under Navigating Lieutenant Pascoe, has also completed a survey of Back Bay, Bombay; and had commenced the re-sounding of Karachi Harbour.

Miscellaneous.—In addition to the extended and useful hydrographic information derived from the Remark Books and periodical returns forwarded from the officers of Her Majesty's ships, special reports of interest have occasionally been received.

Of these latter may be noticed, in connection with the east coast of South America, information relating to the opening up of Port Belgrano, in Bahia Blanco, on the seaboard of the Argentine Confederation; as also on Imbituba, Brazil, by Captain N. Bowden-Smith, H.M.S. *Amethyst*. Useful information relating to the Volta and Ancobra rivers, on the West Coast of Africa, has also been received from Commander Rumsey, R.N., Civil Commissioner in the Volta district, Gold Coast colony. The North Borneo Company has contributed additions to the charts of Dinawan and Gayas Bays; and the Orient Steam Navigation Company to the chart of Diego Garcia in the Indian Ocean.

Valuable contributions to our knowledge of the depths and nature of the sea-bed of the oceans continue to be received from the commercial companies engaged in laying submarine telegraph cables.

In the North Atlantic, the steam-ship *Faraday* (Messrs. Siemens Brothers) closely sounded the area between the parallels of 49° 30′–49° 56′ N., and the meridians of 28° 35′–30° 15′ W. Unexpectedly, comparatively shoal water of 625, 730, and 982 fathoms was found (the shoalest in latitude 49° 41′ N., longitude 29° 6′ W.), where depths of about 1300 fathoms had been anticipated. The sea bottom here is extremely irregular, as between these comparatively shoal depths,

1500 and 1800 fathoms exist. In continuation of the soundings taken in the steam-ship *Faraday* during the years 1874–75–79, when the northern slope of the Flemish Cap (a bank with 72 fathoms on it, near the Great Bank of Newfoundland) was delineated, the eastern approaches were now sounded, and the edges at depths of 500, 1000, and 1500 fathoms respectively determined. The Telegraph Construction and Maintenance Company's steam-ship *Seine*, in carrying a line of soundings between Lisbon and Madeira, struck bottom on a bank about seven miles in extent, rising suddenly from depths of 2200 fathoms with 100 and 118 fathoms rock and coral; this has been charted as "Seine Bank," in latitude 33° 42′ N., longitude 14° 31′ W. The Indiarubber, Guttapercha, and Telegraph Works Company have also forwarded to be charted several off-lying soundings extending from Vera Cruz to Goazacoalcos, in the Gulf of Mexico.

Summary of the publications of the Hydrographic Department during the year 1882:—

Charts.—Sixty-one new plates of charts and plans have been engraved and published; and eighteen plates improved by the addition of new plans. Two thousand seven hundred plates have received corrections by the engraver. Sixty-seven plates have been greatly improved by corrections and additions. Twenty-three thousand two hundred charts have received minor corrections at the hands of the draughtsmen.

The number of charts printed for the requirements of the Royal Navy, for Government Departments, and to meet the demands of the general public, has, during 1882, amounted to 229,700.

Hydrographic Notices, and Notices to Mariners.—Thirty-nine of the first named (containing 213 pages octavo), and 290 Notices to Mariners have been published. In accordance with custom, these publications have been largely distributed at the Home Ports, in the Colonies, to our Consuls, and to Foreign Maritime Authorities.

Books.—During the year 1882, the following volumes of Sailing Directions and other Hydrographical works have been published.

1. Channel Pilot, Part I., 6th edition: containing sailing directions for the approaches to the English Channel, the Scilly Islands, and the south-west and south coasts of England, extending from Trevose Head, on the coast of Cornwall, to the North Foreland. (Date of 1st edition, 1830.)

2. Channel Pilot, Part II., 4th edition: containing sailing directions for the northern coast of France, and the Channel Islands. (Date of 1st edition, 1859.)

3. North Sea Pilot, Part III., 4th edition: containing sailing directions for the east coast of England, from Berwick to the North Foreland, including the estuary of the Thames. (Date of 1st edition, 1857.)

4. The Dardanelles, Sea of Marmara, and the Bosporus, 3rd edition: containing sailing directions for the Dardanelles, Sea of Marmara, and the Bosporus. (Date of 1st edition, 1855.)

5. St. Lawrence Pilot, Vol. I., 5th edition: containing sailing directions for the Gulf and River St. Lawrence. (Date of 1st edition, 1840.)

6. Principal Ports on the east coast of the United States of America, 3rd edition: containing sailing directions for the principal ports and anchorages on the east coast of the United States, comprised between Eastport, in the State of Maine, and Cape Canaveral, in the State of Florida. (Date of 1st edition, 1863.)

7. Persian Gulf Pilot, 2nd edition: containing sailing directions for the Persian Gulf, including the Gulf of 'Omán and the Arabian coast, as far as Rás-al-Hadd, also the Makrán coast between Cape Monze and Rás-al-Kúh. (Date of 1st edition, 1864.)

8. Fiji Islands and adjacent waters (new work): containing sailing directions for the principal portion of the Fiji Islands and adjacent waters.

9. Supplement No. 1, to Africa Pilot, Part I., embracing a recent examination of the Oil Rivers (new work).

10. Supplement No. 1, to Australia Directory, Vol. II., result of a recent survey of Normanby Sound and Prince of Wales Channel, Torres Strait. (New.)

11. Admiralty catalogue of Charts, Plans, and Sailing Directions (amounting to 2680 engraved plates, as also of 83 books and pamphlets of sailing directions), with the scale, official number, and price of each chart and book attached, for the year 1882.

12. Tide tables, British and Irish ports, for the year 1883; also the times and heights of high water at full and change for the principal places (upwards of 3200 in number) over the globe.

13. Admiralty lists of Lights throughout the world (5280 lights, of these 779 are in the British Islands), comprised in ten pamphlets, corrected to 31st December, 1881. Published early in 1882.

The following "Sailing Directions" are preparing for publication:—West Coast of England, 3rd ed.; West India Pilot, Vol. I., 4th ed.; Africa Pilot, Part II., 3rd ed.; Red Sea Pilot, 3rd ed.; China Sea Directory, Vol. III., 2nd ed.; China Sea Directory, Vol. IV., 2nd ed.; Australia Directory, Vol. I., 8th ed.; New Zealand Pilot, 5th ed.; Vancouver Island Pilot, Supplement.

GEOGRAPHICAL NOTES.

Nordenskiöld's Greenland Expedition.—Baron Nordenskiöld touched at Thurso on the 21st of September on his return from Greenland, and telegraphed the chief results of his journey to the London newspapers. He reports that the inland ice party started on the 4th of July from Auleitsivik Fiord. They penetrated 87 miles eastward, and to an altitude of 5000 feet, the soft snow preventing them from proceeding with sledges; but the Laplanders were sent on snow shoes 143 miles further, travelling over a continual snow desert to a height of 7000 feet. The conditions for a snow-free interior on which he had speculated at the commencement of his undertaking, the Baron naturally adds, do not exist here. The inland party, however, as well as the other divisions of the expedition, obtained results in physical geography and biology which will render the voyage memorable.

The American Polar Station at Lady Franklin Bay.—The attempt made by the American Government to relieve the large party under Lieutenant Greely, who have now passed two winters at Lady Franklin Bay, failed again this summer, Smith Sound being found impenetrable on account of the ice. The *Proteus*, sent for the purpose, was crushed in the ice, and foundered on the 23rd July, the crew escaping with difficulty to Cape York, whence they were rescued by the U.S. steamer *Yantic*. Baron Nordenskiöld has since reported that the Esquimaux between Waigattel and Cape York informed Dr. Nathorst that the members of the Greely expedition, except two who had died, had escaped south to Littelton Island.

The Dutch and Danish Arctic Expeditions.—The public anxiety with regard to the two expeditions in the *Dijmphna* and the *Varna* has been relieved, by the receipt of telegrams with the welcome announcement that the members are all safe (except the boatswain of the *Varna*, who was dead) after their long winter imprisonment. The *Varna*, however, had been wrecked, and the members of the Dutch Meteorological Expedition and crew had, after spending some weeks on board the more fortunate *Dijmphna*, landed at Waigats, where they were found by Captain Welde, of Sibiriakoff's steamer *Obi*, on the 26th (?) of August. Our Associate, Mr. A. H. Cocks, writing from Vardö on the 31st of August, says the *Dijmphna* and the *Varna* lay beset in company all the winter in lat. 71° 34′ N., long. 62° 51′ E. The *Varna* was crushed by the ice on the 24th or 25th of December and filled, so that the crew were unable to save any stores; the ship's company were then received on board the *Dijmphna*, and from that time lived on her provisions, which will of course cripple the resources of the latter vessel. The ice held the *Varna* up, so that she did not sink till the 24th of July. The members of the expedition and crew left the *Dijmphna* in four boats on the 1st of August and reached Waigats on the 25th, where they were discovered by Captain Welde, and afterwards picked up by the *Louise* and taken to Hammerfest.—In a letter dated August 1st, to Mr. A. Gamél, the munificent promoter of the Danish Expedition, Lieutenant Hovgaard says that the moving floes became very threatening in the first days of November, when the crew of the *Dijmphna* slept every night close to the sledges, ready to escape in case of accident to the ship. After a fortnight's calm the movement of the ice recommenced on the 7th of December; they were driven by it towards Cape Wen Gau, and from this time to the end of January their position was so precarious that all on board slept every night in their clothes. The ice pressure increased, but did not actually reach the two vessels till the 24th of December, when the *Varna* was completely crushed, the *Dijmphna* escaping damage. The depôt of provisions and stores, which had been placed on a large floe, was saved with difficulty, when the floe itself collapsed. After the end of February the ice remained perfectly quiet, and did not break up round the two ships until the 11th of July. On the 24th of that month the *Varna* foundered, without causing damage to the *Dijmphna*, distant only 170 yards from it. The addition of the scientific men and the crew of the wrecked *Varna* increased the number on board the *Dijmphna* to forty-one men, and as scarcely anything was saved from the Dutch vessel, the provisions laid in for the Danish Expedition have been so reduced that there remained only enough preserved meats for seven months' consumption of twenty men. Lieutenant Hovgaard concludes by saying that it is his intention, if the *Dijmphna* does not get free this summer, to send back ten or twelve men to Denmark, and pass himself another winter with the remainder; but if she does get free early

enough, he will carry out his original plan as far as his slender stock of provisions will allow, and he hopes at least to be able to complete the map of the Kara Sea. He adds that the naturalist of the expedition, M. Holm, has made large zoological and botanical collections by dredging.—A further telegram from Hammerfest dated September 4th, confirms the news of the arrival there of the steamer *Nordenskiöld* with the *Louise* in tow, having on board the crew of the *Varna*, of whom one man had died. Valuable magnetic observations are reported to have been taken by the expedition.

Mountain Climbing in the Himalaya.—Mr. W. W. Graham, who is travelling in the Himalaya with the two Swiss guides, Emil Boss and Ulrich Kaufmann, the companions of the Rev. W. S. Green in his recent ascent of Mount Cook in New Zealand, has reached the summit of a peak near Nynee Tal, which he has named Mount Monal, at an elevation of 22,326 feet. He has also ascended very nearly to the summit of Dunagiri, a peak north of Nanda Devi, having reached the height of 22,500 feet; a sudden and violent snowstorm alone preventing him from accomplishing the remaining 684 feet which separated him from the top. A remarkable fact in this feat of mountain climbing is that Mr. Graham did not suffer from the rarefaction of the air at this great altitude. Nanda Devi itself he found impracticable; his coolies deserted, and he and his guides, heavily laden with baggage, were obliged to find their way back over extremely difficult ground. Mr. Graham may be congratulated on having reached the highest altitude at present attained, exceeding that of the late Mr. W. H. Johnson, who, according to Colonel Montgomerie, once forced his way over a ridge 22,300 feet above the sea.*

Dr. Fischer's return to Zanzibar.—A brief telegram announcing Dr. Fischer's return to the coast has appeared in the daily papers since our last issue. By letters more recently received from Zanzibar we learn that after the encounter with the Masai in the latter part of April, just before Mr. Thomson came unexpectedly on his track, the German traveller continued without further mishap in a north-westerly direction towards his destination, Lake Bahringo. He did not, however, succeed in reaching that point, the men of his caravan, who were serving him on condition that they should be allowed to trade on their own account, having found an excellent market about half-way, at Lake Naivash. Here they remained until they had traded away all their goods for ivory, when they wanted to return. Lake Naivash, or Nabasha, now seen by European eyes for the first time, is described as a sheet of water nearly circular in outline, some eight miles across and with an island in the middle; it is distant, according to the natives, ten marching days from Bahringo. Dr. Fischer fell ill of fever here, and on the return journey

* 'Proceedings R.G.S.' old series, xix. p. 363.

had to be carried in a cot for twenty-four days. He is believed to have been successful in his natural history explorations, during the five or six months he has been travelling in this new and prolific region, and has brought down to the coast, besides 4000*l.* worth of ivory (belonging to him or his men), ten cases of zoological specimens, chiefly birds.—Mr. Thomson writes from Taveta, when on the eve of starting afresh for Victoria Nyanza on the 5th of July, that the caravan he had joined formed now a party 700 strong, and that he had good prospect of success; he would pass by Lake Naivash on his way to Kavirondo.

Recent News from the Congo.—When Mr. Johnston, whose narrative we give at the commencement of the present number, left the Congo, Mr. Stanley was about starting from Stanley Pool for the upper river. According to recent news he returned early in August, having ascended as far as the mouth of the Ikelemba, or Kassai, where he founded an advance station and appears to have met with success. Lieutenant de Brazza's expedition is reported to be at a standstill on the Upper Ogowé. Further deaths of members of the International party are recorded, the most serious being those of Lieutenant Janssen who was drowned with the Abbé Guyot by the capsizing of a canoe in crossing the Congo near Msuāta, and Captain Hanssen who was killed by the natives in attempting to reach the Niari river overland from Manyanga. Lieutenant Janssen and the Abbé Guyot were on their return from the Wabūma or Quango, up which the former had been sent by Mr. Stanley to found a station, the Abbé accompanying him with the object of establishing a Roman Catholic Mission at the same station. Their canoe was manned by eleven Zanzibar men, eight of whom lost their lives by this lamentable accident.

Death of Ernest Marno, the African Traveller.—The death is recorded of this meritorious traveller, who had spent many years in exploring the Egyptian Soudan and had published on the subject (in Vienna) two important works, 'Reisen im Gebiete des Blauen und Weissen Nil, &c., in 1869–73,' and 'Reise in der Egyptischen Æquatorial Provinz und in Kordofan, in 1874–76.' He was born at Vienna in 1844, and started on his first journey to Abyssinia in his twenty-second year. He joined Colonel Gordon on the Upper Nile in 1874, and accompanied Colonel Chaillie Long to the remote Central African districts of Mundo and Makraka; subsequently, Gordon appointed him Governor of the Province of Galabat. In 1877 he served for a short time in East Africa as a member of the first Belgian International Expedition. He appears to have been on his way to Europe to recruit his health, when he died, at Fazogl, on the 17th of August last.

Obituary.

Vice-Admiral Sir Richard Collinson, K.C.B.—Our Society has lost by the death of the eminent Arctic navigator, Sir Richard Collinson, which occurred on the 12th ult., one of its most distinguished Members, and one who for a long series of years occupied a prominent position on its Council. Between 1855, the year of his election as a Fellow, and 1875, when his appointment as Deputy-Master of Trinity House necessitated his retirement from active participation in the Society's work, he served either as a Member of Council or Vice-President for eighteen years, and was a most indefatigable Member throughout of our chief working committees. We are indebted to Major-General T. B. Collinson, the brother of the deceased admiral, for the following biographical details :—

Admiral Sir Richard Collinson was the third son of the Rev. John Collinson, rector of Gateshead, and afterwards of Boldon, both in the county of Durham ; and was born in the year 1811. When he was twelve years old he was put into the Royal Navy, by a sudden and unexpected, but as it turned out a happy, accident ; for he was a born sailor, and had, as a school-boy, shown the pluck and determination which is the characteristic of that profession. Early in his naval career he took to the scientific line, beginning as a midshipman in 1828, with Captain Forster in the *Chanticleer*, on a voyage of scientific surveying round the coast of South America, in the course of which a careful examination was made of the levels of the Isthmus of Panama. In 1834 he was with Captain H. Austin, in the *Medea*, one of the first war-ships in which steam was employed. Next, as a lieutenant, he was appointed one of the surveying officers of the *Sulphur*, under Captain Beechey,—again on the coasts of Central America.

By this time he had established a name in the Hydrographic Office of the Admiralty, whose then able superintendent, Captain Beaufort, was from that time till his death, a sincere admirer and firm friend of Richard Collinson. Captain Beaufort's good opinion of him led to his being selected, on the outbreak of the first Chinese War in 1841, to act as surveying officer to the fleet. This duty, which was a somewhat novel one, was, in the hands of Lieutenant Collinson, raised into an important branch of the war enterprise ; he had a small vessel given him, the *Bentinck*, and in consort with his old shipmate and great friend, Captain Henry Kellet, who happened to arrive in China at that time from a surveying expedition on the American coast, these two acted as the pilots to the fleet in the harbours and rivers into which the expedition had necessarily to penetrate. The course of the war compelled the fleet to enter more than one large river, and among these was notably the great river of China, the Yang-tsze-kiang, now no doubt well known to all the seafaring world, but then an *aqua incognita* absolutely ; and not only were its waters unknown to them, but they were in ignorance of the preparations of defence made by the Chinese. In advancing up this river Captain Kellet and Lieutenant Collinson had to keep ahead of the fleet, buoying out the channel day by day ; by their help the war-ships successfully reached nearly 200 miles from the mouth. Operations like these required a ready scientific skill, as well as coolness and courage, and involved an amount of personal labour requiring great activity, endurance, and zeal. In them Lieutenant Collinson showed such capability in the more warlike as well as in the scientific branches of his profession, that Admiral Parker, the naval commander of the expedition, took him greatly into his confidence, and intrusted him with various important duties, and valued his opinion greatly. The result on the whole was that Lieutenant Collinson came out of the war a post-captain and a C.B.

On the conclusion of the Chinese War there arose a desire to have the coast of China surveyed to enable merchant ships to take advantage of the openings gained by

the war into the various new ports in that country. The duty was handed over to Captain Collinson in the *Plover* (as the *Bentinck* was renamed), and with him was associated his friend, Lieutenant Bate, in a small schooner called the *Young Hebe*. These two little vessels for three years worked along the Chinese coast, from Chusan to Hong Kong, including the Island of Formosa, and produced the charts which are still the guides for the extensive sea-traffic now frequenting those seas.

His next scientific service was the one in connection with which he is most widely known—the search after the missing ships of Sir John Franklin's expedition in the Arctic Seas. It was in 1849, on the return of Sir James Ross from one of the fruitless attempts in this search on the eastern side, that the Government determined to make another from Behring Straits on the western side of the North-west Passage; and, again, on the recommendation of Sir Francis Beaufort, Captain Collinson was placed in command of the expedition; which consisted of the same two vessels employed under Sir J. Ross, namely, the *Enterprise* and the *Investigator*, the latter commanded by Captain M'Clure.

After passing round Cape Horn into the Pacific Ocean, the two vessels were separated, and Captain M'Clure in the *Investigator* arrived first at the Straits; that officer proceeded on at once, taking a course according to his own judgment, without waiting for the decision of the commander of the expedition. This action, however conscientiously taken, judging by the results, had an unfortunate effect on the proceedings of both ships; for though the *Investigator* was the first to discover a north-west passage, she had to be abandoned in the ice, a monument of her own discovery. The *Enterprise* made the same discovery shortly afterwards, and was fortunate in returning safe to demonstrate it.

Captain Collinson, on arriving at Behring Straits, and finding that his consort had gone on, attempted to pursue the line of search he had previously determined on following. That was to keep along the coast of North America, where the river water coming from the south kept an open channel in the ice every autumn, and by which he hoped to reach the passages south of Peel Sound, where it was generally expected some traces of Sir J. Franklin would be found. He was too late in the season to effect this, but in the following year he succeeded in penetrating along this route as far as Victoria Straits, in longitude about 100° west; the ship having got as far as Cambridge Bay, longitude 114°; in the course of this work the *Enterprise* was shut up in the Arctic Seas for three years and a half, thus being left a longer time to her own resources than any other ship in modern times. He then had the mortification to find that owing to an error of calculation in England, the supply of fuel was coming to an end. But for this, he would have remained, and, had his consort been with him, would have, in all human probability, succeeded in the object of his search, as his exploring parties were almost in sight of the spot where, three years afterwards, the boat of the missing expedition was found by Captain M'Clintock's party. Although, owing to those mishaps, the *Enterprise* just missed both the honour of that discovery and also that of the North-west Passage, they had the satisfaction of having virtually made the passage, by overlapping in longitude the tracks of other vessels which had come from the west side, the end of each track being connected with the other track by a navigable channel; and also they had the credit of bringing the ship safe home after this long and protracted expedition. There were other difficulties he had to contend with on board his own ship in the way of discipline, which hampered his action. But the hardest trial of all was, on his return home, to find himself rather coldly received by the Admiralty, with whom a trouble about discipline was of more concern than the explorations in the Arctic Seas.

The Royal Geographical Society, however, showed their high appreciation of the

service he had performed in examining the coast-line of Arctic America and in opening up a fresh field for whalers, by conferring on him in 1858 their Founder's gold medal, and making him a member of their Council. But the absence of proper acknowledgment or reward for his service by the Government, was so deeply felt by him that he never again applied for employment from the Admiralty. He was, however, employed for a little time on certain commissions connected with the naval service, such as the naval defence of the Canadian Lakes, and the defences of the United Kingdom generally.

For several years after his return from the Arctic Seas he devoted himself to the care of his aged father, then in failing health; and on his death in 1857, Captain Collinson provided a home for his mother and sisters in the house in Ealing, where the family have remained ever since. A coincidence of good omen occurred in the name of the house. He himself wished it appropriately to be called "The Haven," and afterwards found that the proper name of the bit of common land in front of it was Haven Green. A haven he made it for twenty-six years, not only for those most dependent on him, but for all his connections whose business brought them within reach of it.

Subsequently to his settlement at Ealing, the deceased admiral was elected a Younger Brother of the Corporation of the Trinity House. He was promoted to be an Elder Brother in 1862, and in this capacity he so gained the esteem and confidence of his colleagues, that, thirteen years after, on the death of Sir Frederick Arrow, he was chosen to be the Deputy-Master, a most unusual honour to be paid to an officer of the Royal Navy.

The Corporation of the Trinity House was first established in the reign of Henry VIII., for the purpose of assisting the mercantile marine of the country, and it has continued down to the present day without intermission, although its functions have now been limited to the care of the lights and marks of our harbours, and to the superintendence of pilotage, and of the examination of officers of merchant vessels, and attendance at the Admiralty Court. It has been managed by a board of "Elder Brethren," as they are called, elected by themselves from the masters of merchant vessels, and occasionally from the officers of the Royal Navy. The head of the House, or "Master," as he is called, has been for many years chosen from among the highest personages of the kingdom. The Duke of Wellington, Lord Palmerston, and Prince Albert each held the office, and at the present time our sailor prince, the Duke of Edinburgh, is Master. Under him is the "Deputy-Master," who is really the working head of the establishment, and a responsible and anxious office it is. He has to see that the working of the different standing committees of the Elder Brethren for the different departments of the whole business are carried on harmoniously together; and to preside at the meetings of the whole body, held twice a week, and see that their decisions are carried out; and he is the commander of the considerable fleet of steamers and of the large body of keepers connected with the lighthouses; besides being also in constant communication with the Board of Trade, under which department the Corporation is now placed. And as the efficiency of the lights and marks on the coast depends on constant watchfulness, and any temporary obstructions, such as wrecks, have to be looked to immediately, the Deputy-Master cannot be long away from his post.

After some years' unremitting fulfilment of these duties, his health failed, and he began to suffer once more from both the scurvy engendered by his three years in the dark north, and the fever and ague implanted in him on the China coast. But the same determination to persevere with his duty to the utmost of his ability, which had carried him through the work in China and the Arctic Sea, now kept him at his post in the Trinity House, until, at last, he was reduced to such a state of weak-

ness, that it was beyond the power of all the skill and all the care which could be brought to bear on the case, to prevent the downward progress of his vital power. After nearly two months' oscillating between the direction of life and that of death, the vital action grew fainter and fainter, and at length ceased.

During the greater part of the last twenty-six years, besides taking an active part in the management of the Royal Geographical Society, he had been also a member of the Council of the United Service Institution, and from his position at the Trinity House had become lately an *ex-officio* member of the Thames Conservancy Board, and of the National Lifeboat Institution, besides other public bodies connected with the royal and mercantile marine of the country. He was one of the first supporters of Major Macrae in starting the "Army and Navy Co-operative Society," and at its foundation and for some years afterwards he was Chairman of the Board of Directors—and a Directorship in that society is no sinecure. But he had also the feeling which he had imbibed from the paternal home, that it is the duty of every man who has time and capability, to take part in the local institutions of the place wherein he happens to be living. He was for some years a member of the Local Board of Ealing, and had been a churchwarden both of Christ Church and St. John's, and up to the last he was a member of the Ruri-Decanal Association of the Church district, and of the Committee for the Management of the Elementary Schools of the District. For all these subsidiary duties to his main one at the Trinity House he had the same desire to throw himself into the work heartily, and apply all the power he possessed towards it. Whether it was in the scientific societies or public offices in London, or in the local institutions in Ealing, there was the same original thoughtfulness, practical good sense, and firm determination to forward the real business of the institution to the utmost of his ability through all difficulties. In politics he continued in the belief in the Conservative principles in which he had been brought up; from the mature conviction confirmed by his practical experience of other countries, that those principles were best calculated to insure the independence of this country and the stability of its institutions. In the ecclesiastical matters which during the latter half of his life have so much roused the country, he was, like his father before him, a moderate High Churchman. A firm believer in the doctrines and in the institutions of the Church of England and a true lover of her services, which throughout all his varied voyages he had never ceased to use, he still looked more to the practice of those doctrines in his daily life, both public and private, than to the forms and ceremonies of the services. He was a fair specimen of the determined, yet careful, life-enjoying, simple character of the British sailor, and, as far as in him lay, endeavoured to be "upright, and one that feared God and eschewed evil."

He died at his home, The Haven, Ealing, on the 13th September, and was buried at the neighbouring village of Perivale, on the 17th. Among the numerous mourners who headed the long funeral cortège, were his two eminent Arctic colleagues, Admirals Sir G. Richards and Sir Leopold M'Clintock, besides Mr. Murray and Mr. Belither, his shipmates on board the *Enterprise* in its long Arctic voyage. Miss Cracroft, the niece of the late Lady Franklin, deposited on the coffin a wreath with the inscription:—"In Grateful Memory of Arctic Service in the Search for Sir John Franklin, and of never failing Sympathy and Aid given to his widow, Jane, Lady Franklin. Whatsoever his hand found to do, he did it with his might."

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

SOUTHPORT MEETING, 1883.

The meeting of the British Association was held this year at Southport, from the 19th to the 26th of September. The Geographical Section was organised as follows:—

PRESIDENT.—Lieut.-Colonel H. H. Godwin-Austen, F.R.S., F.G.S., F.R.G.S., &c.

VICE-PRESIDENTS.—Sir Rawson W. Rawson, K.C.M.G., C.B.; Rev. Canon Tristram, D.D., F.R.S.

SECRETARIES.—John Coles; E. G. Ravenstein; E. C. Rye (*Recorder*).

The President's Address to the Section.—My predecessor, Sir Richard Temple, selected for the subject of his address to this Section last year "The Central Plateau of Asia," and he treated it not only from a broad and general geographical, but also, and to some extent, a political and historical point of view. Following him, in a measure, over some of the same ground, I have selected the mountain region south of the Central Asian highlands—viz. the Himalayas, and more particularly the western portion of that range, as the subject of this paper. I propose considering this mountain chain with reference to its physical features, past and present; and consequently with reference to its geological history, so far as that relates to later tertiary times—i. e. the period immediately preceding the present distribution of seas, land, rivers, and lakes. It is not, however, my intention to enter very deeply into the purely geological branch of the subject.

Comparatively little of the earth's surface now remains unexplored, but much remains to be surveyed and examined in a more scientific manner. Within the last fifty years explorers have made known to us the general features of those dotted or blank spaces which, as boys, we used to look at in our school atlas sheets with so much curiosity, mingled with no little desire to discover the hidden secrets of the unknown lands so shown. The student of the present day enjoys information more or less accurate respecting countries which to us were mere speculative shadows.

But there are other atlas sheets beneath, and only a very few feet beneath, those of this present day, which are closely connected with the latter, and beneath them, again others lie still deeper which have modified the geography of this earth over and over again. It is to such a sheet or two relating to the great Himalayan chain that I now invite your attention. If we wish to deal with physical geography (and to my mind it has equal charms with either pure geography or exploration) our inquiry must, if we wish it to be of any really scientific value, be based on geological structure. We must study the ancient atlas sheets, one by one, which nature is, day by day, revealing to us by denudation of the present surface, taking away and building up the material for atlas sheets of future epochs. Geography and geology are very intimately related; each is truly based upon the other. Local changes of temperature on the surface of this earth, and internally the slow shrinking of its crust, have effected gigantic changes of its surface, and are still altering the topographical features of every country. Directly we look back in time and space and note what changes have taken place, the science of geology steps in, and with it mathematics, chemistry, botany, and zoology. A raised sea-beach with its dead shells, or a submerged forest with the remains of its former fauna and flora, geologically an event of yesterday, sends us back thousands of years into the past

thinking of what were the aspect and dimensions of the former land; therefore, to be a good geographer, something should be known of geology and its kindred sciences. This will be my excuse if in this address I dip somewhat below the surface, and, as some may think, introduce too much geology into this Section. The basis, however, of this branch of knowledge is geography, and this the Royal Geographical Society and the British Association in this particular Section do all they can to foster. There is no gainsaying the fact that very many of our ablest men of science, the ablest naturalists and geologists this country has produced (and it has taken a leading part in geology), have commenced their careers in connection with geographical exploration. Darwin's earlier studies were prosecuted whilst he was attached to marine surveys in other parts of the world; through the same school passed Huxley and Edward Forbes. There was no better example of an able geographer and geologist than Sir Roderick Murchison, who for years took a leading part at these meetings. The list might be largely extended—Sir Joseph Hooker, Wallace, Wyville Thomson, Moseley, &c. That most seductive of all studies, the geographical distribution of species, is intimately connected with geographical exploration. Just as the navy owes much of its efficiency to our coasting and mercantile marine and to our hardy fishermen, so have geography and other sciences been strengthened by the labours of those practical and scientific men who have been engaged in marine or territorial surveys.

The Himalayas, the highest mountains in the world, have excited the interest of many travellers and many geographers; very much has been written about them, some from personal knowledge, and a good deal on second-hand information. Much confusion has resulted from the features of the north-western area being so dissimilar in composition to those of the rest, or eastern part of the chain, and the limitation placed on the breadth and extent of the whole as a mountain mass. There has been a tendency to apply the term "Himalaya" in too extended a sense; it should, I consider, be restricted to those portions which dominate the plains of India, from the inhabitants of which country we have derived the name. This would, strictly speaking, apply only to the snowy range seen from the plains of India bordering upon the course of the Ganges; but we might, I think, use the term in an extended sense, so as to include that which we may call the North-western Himalaya, north of the Panjab, and also the Eastern Himalaya, bordering on Assam.

The orography of this mountain mass has been recently ably handled by Messrs. Medlicott and Blanford,* and I follow them in all their main divisions and nomenclature, which are based upon a thorough understanding of the rocks of the country. Some line must be selected where the term Himalaya in its widest sense must cease to be used, and this certainly cannot be better defined than by the valley of the Indus from Attock to Bunji. On this line we find the great bending round or change in the strike of all the ranges. Strictly speaking, the change commences on the south, where the Jhelum river leaves the mountains, but this line, north of Mozufferabad, continues on into the above-mentioned part of the Indus valley. To the mountains north of the Indus on its east and west course the name Himalaya should certainly never be applied. For this north-west trans-Indus part of the Asian chain we have the well-known name Mustagh, so far as the head of the Gilgit valley: the Hindu Kush being an excellent term now in common use for its extension to the Afghan country.

The observations made by many of the assistants of the Indian Geological Survey, more especially by Stoliczka, and more recently by Lydekker† in the

* 'A Manual of the Geology of India,' 1879, p. 9.

† 'Memoirs of the Geology of India.'

Himalayas, combined with those made by myself in the same region, have, when considered in conjunction with the ascertained strike of the granitoid or gneissic rocks, led me to separate the great Central Asian chain into the following five principal divisions, with some minor subdivisions :—

*Central Asian Chain.**

1. The main axis or Central Asian, Kuenlun.
2. Trans-Himalaya.
3. Himalaya.
4. Outer or Lower Himalaya.
5. Sub-Himalaya.

I use the word "chain" in its widest meaning, so as to comprise the whole length and breadth of a mountain mass, and not, as it has been sometimes used, to describe a "chain" or single line of mountain peaks.

I show these and the equivalent ranges of other geographers and authors in the accompanying synoptical form ; and if sections be made, at intervals of about 100 miles apart, through the whole mass of the chain from the plains of India to Thibet, they show where the different ranges are locally represented, and how they separate or are given off from the main axis lines. The same scale for both vertical and horizontal measurements should be used, because there is nothing more misleading than sections in which an exaggerated vertical scale is used. In our present state of ignorance as to the composition of the chain eastward from the source of the Sutlej, we cannot attempt to lay down there any axis lines of original elevation. The separation by Mr. Clements Markham† and Mr. Trelawny Saunders‡ of the line of highest peaks into one range, and the water-parting into another, is an acceptable solution of the physical features as at present known of this part of the chain. I am led to think, however, that when this ground is examined it will resolve itself into a series of parallel ridges more or less close, and oblique to the line of greatest altitude as defined by the line of high peaks, crossing diagonally even the main drainage line of the Sanpu, just as we see the Ladak axis crossing the Indus near Hanlé, or the Pir Panjal that of the Jhelum. Sir Henry Strachey's conception of the general structure was the soundest and most scientific first propounded.§ He considered it to be made up of a series of parallel ranges running in an oblique line to the general direction of the whole mass, the great peaks being on terminal butt-ends of the successive parallel ranges, the watershed following the lowest parts of the ridges, and the drainage crossing the highest, in deep gorges directly transverse to the main lines of elevation.

It will be seen from sections, drawn as above, that the mountain mass of the Himalayas increases gradually in height from the south to about its central portion and then as gradually falls towards the north side. There is no abrupt and conspicuous slope from the higher line of peaks to the plains ; a succession of spurs from the main water-parting intervenes, and these spurs retain often a very considerable altitude far to the south. The spurs terminate, usually, abruptly towards the plains of India, at an altitude of 5000 to 8000 feet, just within a more or less broad belt of fringing low hills, the well-known Sivaliks.

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* Consult Atlas sheets of the Indian Survey, 1 inch = 4 miles, and latest map of Turkestan and the countries between the British and Russian dominions in India— 1 inch = 32 miles. Compiled under the orders of Lieut.-Gen. J. T. Walker, C.B., R.E., F.R.S.

† 'Thibet.' Boyle and Manning. Introduction.
'Geographical Magazine,' July 1877, p. 173.

§ "Physical Geography of Western Thibet," 'Royal Geographical Society's Journal,' vol. xxiii. p. 2.

		North-western Himalaya.	Western Extension.	Eastern Extension.	Dr. Thomson, 1847–48.	General Cuningham, 1854.	Markham, 1876.	Trelawny Saunders, 1877.	Medlicott and Blanford, 1879.
Tibetan Region.	A. Main axis or Central Asian	1. Kuenlun	Great Pamir near Siri Kul Lake	Yeshil Kul on Aksai-chin	..	..	..	..	Kuenlun.
		2N. Karakoram	..	Compass La, Lingzi Thang, &c.					
		2. Mustagh	to the Baroghil Pass and Hindu Kush	by Rudok to Aling Gang-rhi Peak	..	Karakoram Trans-Tibetan or Bolar	Northern main range (western section)	Karakoram—west	Mustagh
	B. Trans-Himalaya	2S. Shayok	Raki Pushi Peak	to Kailas Peak	..	..	Northern main range (western section)	Karakoram in part, Kailas or Gang-rhi	
		3. Ladak	North Deosai and Gilgit	to Gurla Peak	..	Kailas or Gang-rhi in part	Northern main range (western section)	North Himalaya in part at Gurla Peak	Ladak
	C. Himalaya	1N″. Stock	Kargil	Hanlé	..				
		1N′. Rukshu	Dras and Gures?	Leo Purgial Peaks	..	Trans-Himalaya	..	North Himalaya in part north of Spiti	
		1N. Baralasa	Suru	Parang-la, north of Chini Nilang to Niti passes	..		Central main range	North Himalaya in part	
		4. Zaskar	to South Deosai & Nanga Parbet	Rotang Pass to Chini, to Gangot-rhi, &c.	Trans-Sutlej	Western or Great Himalaya	..	South Himalaya in part at Chini	Zaskar in part Himalaya
		4S. Chenab	Hoksar Pass, cross Sind Valley to Haramuk and Khagan to Palas	Rotang Pass	..	..	Southern main range	South Himalaya in part, south of Chenab	
Himalayan Region.	D. Outer or Lower Himalaya	5. Pir Panjal	Kajnag, Mansehrah, to Sufeid Koh?	Chatadhar, Dhaoladhar, Chor, Nag Tiba to Almora	Cis-Sutlej in part	Mid-Himalaya in part	..	South Himalaya in part	Zaskar in part, Pir Panjal and Dhaoladhar
						The outer Himalaya or Dhaoladhar	..	..	
	E. Sub-Himalaya	6. Sivalik ridges	Attock and Kalabagh	Miri Hills, Assam	..	..	..	South Himalaya in part near Mozufferabad	Sub-Himalaya
Terai Plains of India		..	..	Assam Valley					

It has been laid down that the Himalayan chain culminates in two parallel ranges running through its entire length from the Indus to the Brahmaputra, and these have been called the North and South Himalaya, or central and southern; the two combined (they are very close in parts) really constitute the above chain. We can apply this system to certain portions of the range, but it breaks down when we reach the Sutlej on one side and the Monass on the other. The more we increase the scale of our maps, the greater the number of axial lines we can establish, all intimately connected with, and subsidiary to, the run or strike of the greater series of axial elevations.

Explanation of the Different Ranges.

1. *Kuenlun Range.*—The most westerly extension of this granitoid axis is found W.N.W. of the Zangi-diwan Pass at Oikul and the Victoria Lake. Here Stoliczka records it * with slates and schists resting on it to the southward. Now the next great granitoid axis south of the above, with palæozoic rocks on its northern face, is at the Mustagh Pass, 50 miles to the south of the Kuenlun at Zangi-diwan, and it coincides in position with the gneiss of Kila Panza,† the granitic axis of the Mustagh being continued W.N.W. in the high peaks of Hunza-Nagar. The Kuenlun axis passes by Shahdula eastward by peaks E. 61, 23,890, E. 64, 21,500, up to Yeshil-Kul on the Keria route, for a distance of about 450 miles; beyond this is unexplored country.

I have adopted the term Mustagh as one well known to the people on both sides of the range, and better known than Karakoram, applied by them to the pass of that name. The Karakoram Pass also lies on an axis of elevation further to the north and intermediate between the Mustagh and Kuenlun.

2. *Mustagh.*—This axis, as I have shown above, commences near Kila Panza in Wakhan, thence by the Baroghil and Kerambar passes to the great peaks dominating the Hunza Valley to the Mustagh Pass, eastward by K_2 (28,250 ft.), to the great peaks north of the Shayok, K_9, K_{10}, K_{11}, K_{12},‡ the Sassar Pass, and thence south-east on to the Marse Mik La and the high mass north of the Pangkong Lake, crossing at Nyak Tso on to the high range south of the Rudok Plain, where we again enter unsurveyed ground. It is probably continuous to the Aling Gangri, the old original drainage of the Shayok passing through it at the Pangkong Lake, thus repeating in a similar way that of the Indus through the Ladak range near Hanlé. This most remarkable depression of the whole area, the Rudok plain, lies south-east of the Pangkong Lake, where, on the same meridian as the sources of the Indus and Sanpu, we have a plain only a little above 14,000 feet, which once drained in glacial and preglacial times into the Shayok, rendering that branch as long, probably longer than the present Indus. From a high point above the Pangkong I have looked over this plain; for a distance of some 60 miles it was seen bounded to the south by mountains of over 21,000 feet, and no mountain ranges broke the horizon. The depression is a broad and continuous one here, lower and more extensive than that at the head of the Indus. It is not improbable that it indicates the head-waters of the next great drainage area north of the Indus, viz. of the rivers that find an exit to the sea through Burmah. The Gang-rhi and Karakoram, or Mustagh, cannot therefore be considered as one range separating the Indus basin from that of the northern or central plateau of Thibet. This must lie

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* 'Scientific Results of the Yarkand Mission,' p. 38.

† Stoliczka, *loc. cit.* p. 38.

‡ Unknown and unnamed peaks were thus designated during the progress of the triangulation.

across the broad elevated plateau that extends from the Karakoram Pass, having a general parallelism to the Kuenlun certainly so far as 34° N. and long. 82° E.

The crystalline limestone near the west end of the Pangkong Lake would appear to be the same as the similar limestone at Shigar near Skardo. It comes in, too, on the north side of the great gneissic axis, the northern boundary of which follows the Shayok river pretty closely from Tanksé and Shayok to Khapalu. The foldings in the gneiss which have caught up the palæozoic slates near Tanksé are again on the west indicated by the metamorphic schists on the Indus south of Kartaksho, and by those in the section south-west of Skardo.

2N. *Karakoram-Lingzi Thang Range.*—West of the pass the country is not known. Eastward the line of elevation passes north of the Dipsang Plain to the Compass La, and south of the Lingzi Thang Plain, by the Changlung Burma La to the neighbourhood of the Kiang La, and thence still further east it may pass north of Sarthol into Garchethol.

3. *The Ladak-Gurla Range.*—This is the best defined, as a continuous granitoid axis, on the east and west of Leh; the Indus flows at the base of its escarpment for 190 miles, and this line also was not far from the limit of the ancient nummulitic sea. On the west it unites with the great plateau of Deosai and extends to Gilgit. The Indus drainage has cut through it from south to north into the Skardo basin, and back again to south at the sharp bend at Bunji, while on the east at Haulé the same river passes to the north again, and the range is continued following the left or south bank up to the Gurla Peak, south of the Mansarowar Lake. Thence it is probably continuous up to the Fotu La.

2S. *The Shayok-Kailas.*—This subsidiary axis is well marked on the south of the Pangkong Lake north-west and south-east of Tanksé, running parallel to the Ladak range. It is then to be followed westward, north of the Shayok river to the junction of the Basha Braldoh rivers, and thence to Haramosh and Raki Pushi peaks, and perhaps through Yasin to Tirich Mir on the Hindu Kush. To the eastward from Sajam Peak, the north side of the Indus and Gartangchu to the Kailas Peak, thence very probably north of the head-waters of the Brahmaputra.

4. *The Zaskar Range.*—Where best displayed, is that portion which lies south of the districts of that name in Ladak, and running parallel for 100 miles with the upper sources of that large tributary of the Indus, the river of the same name. In the size of the present glaciers, that fill the upper valleys, this portion more closely resembles the Alps of Europe than any other part of the Himalayan chain. It is continued to the north-west, past Dras, to the southern side of the Deosai Plains, thus coalescing with that great elevated mass of the primitive rocks. It is continued to the Nanga Purbet, 26,620 feet, and it probably continues still further, west of the Indus, the curve of the range bounding Swat and Bajaur on the north towards Kunar, and which, after the central portion, we may term, at present, the Bajaur range. Taking it up in a south-east direction, it bends slightly south, crossing the head of the Bagha river by the Rotang Pass to that line of lofty snowy peaks seen from Simla and other hill stations leading past Chini to the east of the Sutlej, to the famous peaks of Gangot-rhi, Nandadevi, and Nampa. To the majority of Europeans who have visited India this is perhaps the best known portion of the Himalayas.

4N′. *The Rukshu Ridge.*—Two secondary ranges, more or less connected with the last, one intimately so with an axis of trappæan intrusion of early tertiary age, which from Dras to the Mansarawa is over 400 miles in extent, can be followed. The first is conspicuous at the Tsomori-rhi Lake, Mata Peak, 20,600 feet, being of granitic rock; it is seen on the west covered by the earlier sedimentary formations, but it can be traced towards Dras, and on the south-east to the Imis La, curving

thence towards the Leo Purgial mass, the elevated tertiary formations of Hundes coming in on the east.

4N″. *The Stok.*—Another subsidiary and later line of elevation, one I had at first been inclined to disregard in this address, being a minor feature in comparison with the whole chain, flanks conspicuously (attaining the very considerable elevation of over 20,000 feet) the left bank of the Indus for 200 miles, and is still more intimately related to the above trappæan intrusion. It forms a connecting link with the tertiary rocks of the same age on the southern base of the Himalayas (the elevation of which led on successively to the formation of the outermost range of hills, the Sivaliks), and shows the relatively recent date of the elevation of the whole chain, and the obliteration of the topographical details of a previous mountain mass.

4N. *The Baralacha Ridge.*—This line of elevation corresponds with the run of the highly tilted slates, carboniferous and succeeding formations resting against the Zaskar axis, which it follows from near Suru to south of Padam by the Baralacha and Parang passes; here, for a short distance constituting the water-parting between the Indus and Chandrabagha, it can be traced towards the Sutlej, Chini, crossing on to the Keobrang, and in turn the Nilang, Niti, Lakhur, and Tinkar passes, displaying all along this line its characteristic feature, first seen at the Baralacha Pass, of being the main water-parting between the Ganges and Kali basins on the south, and the Indus on the north, and constituting from here to the eastward, with the peaks on the granitic or gneissose axis, the main Himalayan range. In the Nipal area to the eastward, we notice the great similarity with which one river basin follows the other, the only difference being that the watersheds of some lie further to the north than others. We may thus, I think, infer that the above character of the Baralacha axis is the type of the physical features along this unsurveyed, little-known territory, until we reach the longitude of Darjiling.

4s. *The Chenab and North Kashmir.*—South of the Chenab river, running parallel with it for many miles, is another gneissic axis, through which the Chenab passes into a sharp bend to the south near Kishtwar; the peak of Gwalga well marks its position here, and the strike of the same rock is continued towards the northern outer hills of the Kashmir Valley by Barrapatta and Dalwas Peak, near the Hoksar Pass, and the Maro Wardwan Valley below Ainshin. For some distance the stratified rocks only are seen, but on the Boodpathar ridge near Srinagar and in the Sind Valley, and again from near Haramook Peak to Tragbul, the gneissic rocks appear. Further still they occur in the hills at the head of the large tributaries of the Kahmil river, and thence I suspect are continued across the Kishengunga to the Snowy Peaks above Wamba and into Khagan. On the south-east at the Rotang Pass at the head of the Beas Valley it units with the Zaskar axis.

5. *The Pir Panjal-Dhaoladhar Ridge.*—On the outer face of the chain there is a well-marked gneissic or granitoid axis. It is well exemplified on the Dhaoladhar ridge above Dharmsala, directly connected with, and equally well displayed in, the Chatadhar ridge south of Budrawar; thence it can be traced to the Chenab, which breaks through it here, to the south-east side of the Kashmir Valley; forming the eastern end of the Pir Panjal range. We find it at intervals amidst the older slates along the ridge westward, and close up to the gorge of the Jhelum river, where it leaves the valley of Kashmir. It reappears on the other side of the Jhelum in the Kajnag ridge towards Mozufferabad. The gorges of the Kishengunga and Khagan rivers are near this place, and to the westward the granitoid rocks are again met with at Manserah in the Hazara Valley. Little is known of the mountains to the north of this, but the axis apparently crosses the Indus near Amb, curving round in the Yusufzai Hills north of the Peshawar Valley, the Sufedkoh being an analogous

range on the south of the Kabul river. Returning to the Dhaoladhar ridge, the granitoid axis continues to Sultanpur on the Beas across that river, by Tuket, to Hatu, across the Sutlej to Kuper and Kanchu peaks, and the well-known peak of the Chor. Nag Tiba, north of Mussoorie (Masúrí), would mark its eastern extension, beneath the slates of that ridge, and beyond Dudatoli and Binsar peaks, and Almora to the Kali river,* near Meenda Ghur. This axis thus holds the same position with regard to the plains of India and at about the same distance from their base for a very great distance.

6. *The Sub-Himalaya.*—This longitudinal section of the Himalaya is easily defined by the fringing line of hills more or less broad, and in places very distinctly marked off from the main chain by open valleys (*dhuns*), or narrow valleys parallel with the main axis of the chain.

The Eastern Himalaya.—In Western Bhutan, beyond Darjiling, between the Juldoka and the Am Mochu, the gneissic rocks have a north-west strike by the Pango La, apparently towards Kanchinjunga; to the south-east by Betso Peak to the Singchula above Buxa. Hooker records Kanchinjunga as of granite, with stratified rocks to the north. This axis may possibly be continued E.S.E. to Chumala-rhi and the gneiss of the mountains north of Paro.

In the far east, in the Dafla Hills, a more general parallelism of the ranges from west to east is found, assimilating to the north-west area. A well-marked granitoid axis is to be traced from south-west to north-east (the outer Himalaya here), convex to the south-east, the tertiaries of the Sub-Himalaya being of considerable breadth and elevation, and following the same curve. Considerable valleys or dhuns are also again a feature on this side.

Lastly, there is the Assam range, which, although not forming a part of the Himalayan mountain system, I must allude to, as I shall have to refer to it further on. This is very clearly defined by a gneissic axis on its southern margin, against which the secondary rocks rest, and by a more northern line of the same primitive rock succeeded by another of isolated low hills following the northern base and the course of the Brahmaputra, and generally lying to the north of it. The last outcrop is seen at Dhoobri, and thence it is no doubt continuous across the delta to similar outcrops of Bengal gneiss on the Ganges, thus connecting this axis of elevation with that of peninsular India. The above range is convex to the south, curving up to the north-east in the Lhota Naga and Nowgong Hills, and to the W.N.W. in the Garo Hills.

The Burrail range forms another subsidiary line of elevation to the above from the Naga Hills to Jaintiapur, and falls away dipping under the Sylhet *bhils*,† to reappear at the most south-west point of the Garo Hills. From its highest point in the Naga Hills (Japvo), where the strata become nearly horizontal, it merges into and throws off the high north and south ridges that bound the Munipur Valley on the west, to join the Lushai Hills on the south. This I would call the Western Munipur and Arakan range. It has no granitoid axis; but to the north-east of Munipur a great mass of intrusive rock occurs at the high peak of Shuruifurar, and thence a high line of elevation runs N.N.E. to Saramethi Peak, and to the south forms the Eastern boundary of the Munipur Valley, and might be called the Eastern Munipur range—it is the water-parting between the above valley and that of the Kyangdweng.

We can, in a measure, exemplify the structure of the Himalaya by that of the

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* Captain R. Strachey, R.E., F.G.S., 1851.

† *Bhil* or *jhil*—Hind., a marsh.

bones of the right hand, with fingers much elongated and stretched wide apart, of which the wrist and back may represent the broader belt of granitic rocks of the eastern area, the thumb and fingers the more or less continuous ridges of the north-west, some less prolonged than others to the north-west, such as the Chor axis, which may be represented by the thumb, terminating on the southern margin near the Sutlej. The left hand placed opposite will represent the same features to the west of the Indus. We will even carry this simile further, and as a rough illustration suppose the intervals or long basins between the fingers to be filled with sedimentary deposits, and the fingers then to be brought closer together, producing a crushing and crumpling of the strata. At the same time an elevation or depression, first of one or more of the fingers, then of another or of the whole hand has taken place, and you are presented with very much what has gone on upon a grand scale over this vast area. As these changes of level have not taken place along the whole range from east to west in an equal extent, but upon certain transverse or diagonal lines, undulations more or less great have been the result, and some formations have attained a higher position in some places than in others, producing, very early in the history of these mountains, a transverse system of drainage lines, leading through the long axial ridges.

The last efforts of these rising, sinking, and lateral crushing, and, as I believe, very slowly acting forces, are to be seen at the southern face of these mountains in the tertiary strata that make up the Sub-Himalayan axis (Sivalik), a topographical feature which is most striking by reason of its persistence and uniformity for some 1600 miles; for, although a similar and synchronal elevation of the Alps has taken place, the same regularity of orographical features has not been the result, most probably from the difference in the original outline of deposition in the latter area. One object in this address will be to endeavour to point out and compare some of the physical features of the two great European and Asiatic chains.

From Assam on the east to the Panjab on the west, bending round and extending to Scinde, this fringing line of parallel ridges is found at the base of the Himalayas, sometimes higher, sometimes wider, often forming elliptical valleys. Only in one part of the belt east of the Teesta are they absent altogether, and for a distance of 50 miles the metamorphic rocks rise directly from the plains of India,* a feature representing a great break—the correct interpretation of which will tell us very much of the past history of these mountains. These formations are of vast thickness, and in the Panjab, where they attain their greatest width and elevation between the Chenab and the Indus, cover an area of 13,000 square miles.

The whole of this material has been derived from the adjacent Himalayas, representing many feet of the older and higher mountain ranges, and has travelled down valleys that had been excavated in pre-tertiary times. This points to a slow subsidence of the whole southern side of the mountain mass, deposition generally keeping pace with it, broken off by recurring long intervals of re-elevation. Such important, well-marked features as these cannot be omitted when treating of a mountain system. Many long and instructive pages of its history are written on these rocks, with the help of which we may reconstruct some of the outlines of its more ancient geography.

The next most interesting feature connected with the former distribution of land and sea is that these Sub-Himalayan formations are fresh-water, or torrential, showing that since nummulitic or eocene times the sea has never washed the base of

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* Godwin-Austen, J. A. S. B., 1867, p. 117. 'Memoirs of the Geological Society of India,' Medlicott, vol. iv. pp. 392 and 435.

the Himalayas.* In fact, there is no evidence of this from the gorge where the Ganges leaves the mountains up to the base of the Garo Hills; pointing to an extension northward at that early age of the Arabian Sea, separated from the Bay of Bengal by peninsular India. I am led also to believe that from Assam to Scinde there once existed one continuous drainage line, a great river receiving its tributaries from the Himalayas, partly a land of lakes and marshes, the home of that wonderful mammalian and reptilian fauna which Cautley and Falconer were the first to bring to light. In pliocene times, before the greater displacements commenced, it is not unlikely that the Kashmir Basin drained at the north-west end into the Kishingunga Valley to Mozufferabad, and that of Hundes and Ladak trended towards the same direction viâ Dras.

The southern boundary of this long alluvial plain was formed by the present peninsula of India, and probably of the extension of the Garo and Khasi Hills westward to the Rajmahal Hills.† Depression has been considerable in the neighbourhood of Calcutta,‡ nearly 500 feet. We know probably only a portion of the alluvial deposits. At 380 feet beds of peat were passed through in boring, and the lowest beds contained fresh-water shells; the beds also were of such a gravelly nature as to indicate the neighbourhood of hills, now buried beneath the Ganges alluvium. This is precisely the appearance of the country above Calcutta on approaching the present valley of the Brahmaputra. The western termination of the Garo Hills sinks into these later alluvial deposits, and along the southern face of the range up to Sylhet, the waters of the marshes,§ during the rainy season wash the nummulitic rocks like an inland sea, and point to the very recent depression of all this area. The isolated granite hill-tops jutting up out of the marshy country from Dhoobri to Gwalpara and on to Tezpur all testify to the same continuous depression here. It is exactly north of this that we find the Sivalik formations absent at the base of the Himalayas, and we have the evidence of exclusively marine conditions in pliocene times at the base of the Garo Hills. ‖ We find also a large development of marine beds above the nummulitic limestone in the Jaintia country,¶ passing up conformably into a great thickness of upper miocene sandstones of the Burrail range. In such sandstone north of the Munipur valley the only fossils I found were marine forms.

This gradual depression of the delta of the Ganges, the relative higher level of the water-parting and shifting of the Panjab rivers westward, appear to be only the last phase of that post-pliocene disturbance which broke up the Assam Sub-Himalayan lacustrine system draining into the Arabian Sea. Zoological evidence which I cannot here find space to quote is also in favour of this former connection of the now separated waters of the Ganges and Indus basins, and the hill tracts of the Garo and Khasi Hills with peninsular India.

The ground where the miocene rocks are absent is not where any denuding force from the north could have acted with any abnormal intensity. It lies under the hills where no great tributary enters the plain, and might have removed the above formation. All the evidence is in favour of the axis line of depression in the Ganges delta between Rajmahal and the Garo Hills extending thus far, and that the miocene beds, once continuous, are here thus lost to sight beneath the more recent

* Blanford and Medlicott, *loc. cit.* p. 393.

† Blanford and Medlicott, 'Memoirs of the Geological Society of India,' p. 31.

‡ *Loc. cit.* p. 397.

§ For a very excellent account see Hooker's 'Himalayan Journals,' pp. 263–265.

‖ Colebrooke, 'Geological Transactions,' vol. i. p. 135.

¶ H. H. Godwin-Austen, J. A. S. B., 1869, pp. 12 and 152.

yet extensive gravels and conglomerates that here occur, and have partaken also of a last slight elevation of the mountain chain.

Even if we were to raise the rocks below the delta up to the maximum level of the Garo Hills, about 4000 feet, it would not be a greater alteration of level than we can see now a very few miles distant to the east. The base of the cretaceous formation rests on granite at the peak of Kailas, about 3000 feet above the sea; at 30 miles eastward it is at the level of the plains of Sylhet, scarcely removed above that level: it is here we find a remarkable depression right across the Assam range from north to south, which it is curious to note faces immediately the Monass valley of the Bhutan Himalaya.

Great lateral rolls or waves of the stratified rocks occur at intervals all along the southern line of the chain, and apparently have a connection with the transverse drainage lines. This feature is best seen if we follow the older miocene along its junction with the older rocks. The miocene attains its greatest elevation at Bisari and Keeran peaks—11,200 feet—close to the end of the Pir Panjal axis; it falls thence towards Mari to 7000 feet, and much lower towards the Potwar. Eastwards it is reduced, above Poonch, 9900 feet; near Rajaurie to 7000 feet, and Kamrot 6700 feet—or a fall of 4500 feet in 50 miles. The elevation increases again, upon the Chenab, to 8000 and 9500 feet; and, facing the Chatadhar ridge, it is again of great elevation—9096 feet at Hato Peak, and Mandhar 8932 feet. At the Ravi, by Basaoli, there is a depression, east of that river, to 4600 feet, but it gradually rises again to 6100 feet at Dhurumsala, under the Dhaoladhar ridge, and retains that altitude to the Beas and Sutlej, where it falls again to 4000 feet, which is its altitude about Nahun and the Jumna. In the Deyra Dhun it is only 3000 feet, but east of the Ganges, where there is a local bend in the strike, it rises again considerably. Beyond this the country has not been visited by me. In the eastern area, under Darjiling, it is of little elevation, but rises to about 4000 feet, disappearing altogether near Dalingkote, but near Buxa the formation reappears, and is only some 2000 feet. Nothing is known of the older tertiary rocks up to the Aka and Dafla Hills, but here they attain again large proportions—4700 feet west of the Ranga to 6000 feet beyond that river. South of the Assam range, miocene strata, a distinct group, attain 1500 feet, but are poorly represented in places. At other points, as near the Sylhet *bhils*, they are absent. Near Jaintiapur they expand and reach an altitude of 3000 feet. South of the Lukah river the whole mass gradually rises to 5000 feet near Asalu, and to 9890 at Japvo Peak, its culminating point in the Naga Hills; but these formations are, I believe, marine and estuarine. The great elevation of tertiary rocks here is the exact counterpart of what has taken place on the west, and both are on the great changes of strike in all the formations.

Within the mountains in the old rock basins—and these are analogous to the valleys of the Alps—are pliocene and post-pliocene beds of great thickness, but of fresh-water origin; the remnants of which are to be seen in Kashmir and Skardo at intervals, along the valley of the Indus, and that large—now elevated—accumulation at the head of the Sutlej river in Hundes, first brought to notice by the labours of Captain (now General) R. Strachey. The remnants of these deposits in Kashmir and Skardo are found preserved in the more sheltered portions of the valley basins, untouched by the denuding action during the glacial period—the exponents presented to us of the enormous denudation that went on during the post-pliocene times, of which the glacial period formed a part. The extent and displacement of the upper pliocene beds is in North Italy and here very similar. Often abutting horizontally against the mountains, they are in other places found tilted at considerable angle on the margin of their original

extension. When we examine their contents, we find that the fauna of that time in Asia, as well as Europe, was more African in character, and genera now confined to that continent were abundant far to the north. The sluggish rivers and lakes of Sivalik times in Asia and of the corresponding period in Europe were the home of the hippopotamus, crocodiles, and tortoises, of which the common crocodile, the gavial, or long-snouted species, and an emys have survived the many geological changes, and still inhabit the rivers and low grounds of India to-day. The fresh-water shells are still the same now as then. Many species of antelope lived in the neighbouring plains and uplands; the elephant was there in the zenith of its existence, for no less than thirteen species have been found fossil in Northern India; but it is impossible in a short address to enumerate the richness of this fauna, and the extreme interest that surrounds it.

Miocene of European Area.—If we now turn to Europe to compare formations of similar age, Lombardy and the valley of the Po, with the southern side of the Alps, presents to us somewhat similar physical features. A large area of about the size of the north-west Panjab, once a part of the miocene sea, is occupied by a remnant of rocks of that age, considerably elevated and tilted, but not to such an extent as those of the Himalayas. Near Turin these dip towards the mountains, and a very short examination shows the undoubted glacial character of some of the beds; * and, as the whole formation is marine, their large sharply-angular material, much of which is jurassic limestone, was probably transported from the adjacent mountains by the agency of ice in a shallow sea.† After the great crushing and alteration of the previous outlines of the whole country another sea filled the basin of the Po, and pliocene deposits were laid down in a sinking area extending to the base of the mountains all round the new bay or gulf. Re-elevation again set in, and with it, or soon after it, the advent of another, and the last, glacial period. But the bounds of the pliocene sea extended even farther than the base of the mountains. At the south end of the Lago d'Orta, well within the hills, sheltering under the isolated porphyry hill of Buccione, and 280 feet above the present lake (or 1500 feet above the sea), I had the good fortune to discover this summer a patch of pliocene sands and clays, with marine shells in excellent preservation, which I am not aware has been noticed before. Sixty-four feet of the section is exposed, capped by moraine matter; its base was not seen, and the beds dip north. This remnant tells us a good deal. From where it rests there is a clear horizon to the north down the lake to the junction of its river with the Toce—unmistakable evidence that these beds must have extended far in this northern direction, and that long fiord-like arms of the sea stretched up as far as Domo d'Ossola on one side, and Bellinzona on the other. This marine bed is far above the level of the Lago Maggiore, but I may mention that I also found marine shells of pleistocene age 112 feet above that lake near Arona, of which details cannot here be given.

Before the last great elevation of the Alpine chain the old line of sea-coast, therefore, ran even high up the long deep valleys of Maggiore, Como, Garda, &c., during the early pliocene period; the mountains then, quite as high as now, enjoying a warm, moist climate, not a glacial one. Then came the gradual but uneven elevation of the whole area, including the miocene hills south of the Po, and lacus-

* Refer to Gastaldi.

† No trace has been observed of this glacial period in the miocene of India; the most lofty portions of the chain had not then attained a greater elevation probably than 14,000 to 18,000 feet, and the outer axis lines far less. However, in the tertiary beds (middle eocene?) of the Indus Valley below Leh, such conditions are indicated by Lydekker. 'Memoirs of Geological Survey of India,' vol. xxii. p. 104, which I have received since this address was sent to press.

trine and estuary conditions prevailed over much of the plain country. The lapse of time was probably enormous, and as the land rose and the sea retired the climate gradually became cooler, and ushered in the glacial period. I do not think it would be an exaggeration to add another 5000 feet to the Alpine peaks of that time, which would give them an altitude equal to the Zaskar range of the North-west Himalaya of the present day. With the change and the increased volume of the mountain torrents, the destruction of the upraised marine pliocene beds commenced, and finally culminated in the extreme extension of the glaciers even into the plains, they scoured out almost completely the whole of these deposits, which then filled the great valleys and the country at the base of the mountains, to redistribute them again over the plain of the Po, and silt up what remained there of the old estuary or gulf towards the east. The denudation of this formation has been enormous along the base of the Alps, and only mere remnants are to be found. It is easily seen that their preservation is purely due to the accidental position in places where the great denuding force—viz. the advance of ice from the mountains—has been unable to touch them; in other instances the early deposition of moraine matter upon them has acted like a shield, and prevented their entire destruction. Such examples are well seen near Ivrea, in the well-known section in the gorge of the Chieusella near Stombinella, and in the moraine near San Giovanni.

The scattered remnants of the pliocene formation south of the Alps, which took perhaps thousands of years to lay down, show well how soon a great formation, together with the preserved remains of the fauna living at the time, may be completely destroyed by subsequent denuding forces. Similar destruction must have occurred over and over again in past geological ages, and shows clearly how the scanty, broken record can be accounted for.

It is an established fact that the great valleys of the Alps and Himalaya existed much in their present form during miocene times, and they may owe their excavation partly to the glacial action of that period, when these mountain slopes rose from the plain or margin of the ancient sea, far in front of the present line of slope, and were far higher than now. This idea particularly strikes one when looking at the ice-ground spurs that run out into the plain south of the Lago d'Orta. The general and local elevation and depression that took place in post-miocene times seem quite sufficient to account for the difference in the comparative levels of adjacent transverse valleys, or an elevation along the base of the chain, clearly indicated at Orta by the northerly dip of the marine beds. It is reasonable to suppose that these movements were exerted in different degrees, at points all along this face of the Alps and within the same, and that the depression on the west has been less than on the east, so that the sea never extended far up the valley of Susa, and to a comparatively short distance up that of the Dora Baltea as compared with Maggiore, and the formation and excessive depth of this and similar lakes on the east is mainly due to this local depression and elevation. Depression has steadily continued in the delta of the Po as in the Ganges at Calcutta, for at Venice borings showed depression of land surface to an extent of 400 feet, and they did not reach the base of the formation.*

It is not improbable that during the earlier extension of the glaciers into the Maggiore basin † the sea still had access to it; ‡ this would have greatly aided in the removal of the marine deposits, and then the deeper erosion of its bed near the Borromean Islands, so well put forward by Sir Andrew Ramsay. When we see the

* Lyell, Prin., vol. i. p. 426.

† With reference to the moraines of Ivrea, see pamphlet by Luigi Bruno, 'I terren costituenti l'anfiteatro allo sbocco della Dora Baltea.'

‡ The evidence is stronger as regards the Lago Garda.

gigantic scouring which glaciers have effected on the hardest rocks in the sides and bottoms of valleys, when we know for certain the enormous thickness they reached in the Alps, I do not doubt for a moment their capability of deepening a rock basin very considerably, or their power to move forward over and against slopes so low as 2° to 3°.*

The earliest extreme extension of the glaciers was very great; we have evidence of it on the miocene hills near Turin, their surface being scattered over with transported material of great size, quite unconnected with that other ancient period of glacial conditions during the miocene times, mentioned above, at a period too remote to further dwell upon here. Even now I feel that in dealing with this subject of the glaciation of the Alps, many of you may say that I am departing too much from geography. To this I would answer, glacial periods have been so intimately connected with the interchange of sea and land conditions, that where can the line be drawn in physical geography between the past and the present? It is as undefined as the line which separates species from genera.

An enormous interval of time must have elapsed, during which the cold was increasing and the glaciers advancing, and during which the rivers were distributing the consequent waste over the lower country, spreading out the more or less coarse material, sands and clays, in broad fans in front of all the great gorges. Then came the first period of contraction of the glaciers, with many oscillations. Of this we have the evidence in the moraines of Ivrea, Maggiore, &c. Sections of these moraines show how they were piled the one upon the other; how the building up of one line of lateral moraine was followed by its partial destruction on another forward movement of the ice, and the throwing down of another moraine upon it. Then were formed many of the smaller lakes, remains of which lie amid the débris thrown out into the plain. The glaciers retained this size for a very considerable time, and then apparently very rapidly retreated to far within the mountains, but still for another considerable period their dimensions were much larger than those of the present time, into which they seem to have again rather rapidly shrunk.

Passing from the glacial action displayed in the outer Alps to that in the Himalaya, we find ample evidence of a period of great extension of such conditions, first in the erratics of the Attock Plain and the Potwar,† lying 50 to 60 miles from the gorge of the Indus at Torbela. We have again the fact that in Baltistan, in the Indus valley, glaciers have twice descended far beyond their present limits, first down to Skardo itself, and then to some 30 miles below their present limits; while the glaciers of Nanga Purbet, towering above the Indus some 22,000 feet, must have descended into the bed of that river. Even allowing that the Potwar was not formerly a lacustrine basin, the great *débacles* from the mountains would have been sufficient to convey erratics fixed in ice to where they now lie. Cataclysms of the present time, caused by glacial obstructions, have raised the level of the Indus on the plain above Attock so much as 80 feet. When these glaciers were more than double their present size, gigantic floods must have often taken place, and formed boulder deposits high above present levels; such high level gravels are to be seen not only in the Potwar, but also in the Naoshera Dhun on the Rajaurie Tawi river, containing boulders of nummulitic limestone and other rocks of the Pir Panjal on the north.

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* There appears to be too great an advocacy, on the one hand, of ice action having done all the work of denudation; while, on the other, some writers consider this to have been extremely limited; it is the combination of the two forces, I think, that effects so much and in so different a manner and degree.

† A. Verchère, J. Asiat. S. Bengal, 1867, pp. 113–114; Theobald, 'Records of the Geological Society of India,' 1877, p. 140.

Again, north of the Chatadhar ridge, small glaciers, five to six miles in length, at one time filled the lateral valleys, descending towards the Chenab river to about 5000 feet; and a very perfect moraine occurs in one valley. This ground must be very similar to that which has been described by Theobald as occurring in the adjacent Kangra district* on the flanks of the Dhaoladhar ridge. Similar small glaciers existed, I believe, in the valleys of the Kajnag range, but I think that neither in this range nor in Budrawa did they ever descend into the main valleys; but the existence of these glaciers, together with the large snow-beds, had much to do with the formation of the high-level gravel-beds and fans through which the Jhelum and Chenab have since cut their way.

In fact, examples of the former extension of glaciers are wide-spread along the chain of the Himalayas from west to east. True moraines, and moraine-mounds, at 16,000 feet on the north side of the Baralasa Pass, attest the presence of glaciers on the elevated plain of Rukshu, where now the snow-line is over 20,000 feet.† Drew gives much valuable information regarding their former size.‡ On the east, in Sikkim, Sir Joseph Hooker § has described moraines of great height (700 feet) and extent.‖ Still further south and east, in the Naga Hills, a short period of greater cold is indicated by the moraine detritus under the loftiest portion of the Burrail range in latitude 25° 30′.¶

Whatever may have been the length of the glacial period in the Alps—and it was very considerable—in the Himalayas it cannot have been so long and so general, although, to a certain extent, contemporaneous.

In the Alps glaciation meets the eye on every side, and the mountains, up to a distinct level, owe their form and outline to its great and universal extension.

In the Himalayas it is difficult to trace polished surfaces or striæ markings, even in the neighbourhood of the largest glaciers that are now advancing in full activity. It has been suggested that obliteration is the result of more powerful denudating forces, but the conditions are not so very dissimilar in the high Alps and high Himalaya as to warrant this; and wherever the oldest striæ marks occur in the Himalaya, they are situated near the bed of the valley. It may interest you if I give an illustration or two of the size of these present glaciers as compared with those of the Alps. The Baltoro glacier would extend, if placed in the Toce valley, from the Simplon to the margin of the Lago Maggiore; or take another illustration of its length, from Mont Blanc to Châtillon in the Valle d'Aosta.

Although of such great length, these Himalayan glaciers could never have reached the enormous thickness which the earlier Alpine glaciers attained. This may thus be accounted for: in the European area a generally low temperature prevailed down to the sea-level, while in the Himalayan it was local, and confined to a higher level. It is evident that the snow-line has altered—higher at one period, lower at another—down to recent times, denoting changes of the mean annual temperature, which are not yet fully understood, but have been attributed to a very far distant distribution or alterations of land, sea, and the ocean currents.

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* Theobald, 'Records of the Geological Society of India,' 1874, p. 86.

† North of the Karakoram, in that now arid country, great moraines are found in the valleys that descend into the Karakash, in the neighbourhood of the Sujet Pass, 17,600 feet. (Harold, Godwin-Austen in Epit.)

‡ 'The Jummoo and Kashmir Territories.'

§ 'Himalayan Journals,' vol. i. p. 221.

‖ The equivalents, although very small, of such moraines are to be seen in the Alps on the Simplon jutting out into the valley.

¶ Godwin-Austen, J. A. S. B., 1875, p. 209.

Two periods of glacial extension are clearly defined, separated by a milder interval of climate: during the earlier glacial period the Indus valley was filled with those extensive lacustrine and fluviatile deposits, mixed with large angular débris, such as we see at Skardo, which may be coeval with the extreme extension of the Alpine erratics so far as the miocene hills south of Turin.

The second period followed after a long interval of denudation of the same beds, and would correspond with the last extension of the great moraine, of Ivrea, Maggiore, Como, &c., followed by a final retreat to nearly present smaller dimensions. Nowhere on the south face of the Himalaya do we find valleys presenting any features similar to those of the Southern Alps, particularly on the Italian lakes, which are, I believe, the result in the first place of marine denudation, succeeded by that of depression and finally powerful ice-action. On the south face of the Khasi and Jaintia Hills, however, which are orographically connected with the peninsula of India—the conditions altogether different—we find long stretches of water of considerable breadth and depth extending within the hills and not unlike in miniature the Italian lakes. These valleys, worn out of the sandstone and limestone rock, have been formed here, I think, to some extent by the aid of marine action, and the subsequent depression along this line of hills, also marked here, as in the Western Bhutan Doars by the absence of beds newer than the nummulitic.

This attempt to bring before you some of the great changes in the geography of Europe and Asia must now be brought to an end. It is a subject of vast time, of absorbing interest. I am only sorry it is not in more able hands than mine to treat it in the manner it deserves, and in better and more eloquent language; but it is a talent given to but few men (sometimes to a Lyell or a Darwin) to explain clearly and in an interesting form the great and gradual changes the surface of the earth has passed through. The study of those changes must create in our minds humble admiration of the great Creator's sublime work, and it is in such a spirit that I now submit for your consideration the subject of this address.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

ARCTIC.

Nordenskiöld, A. E.—Vega-Expeditionens Vetenskapliga Iakttagelser, bearbetade af Deltagare i Resan och andra Forskare utgifna af A. E. Nordenskiöld. Andra Bandet. Stockholm (F. & G. Beijers Förlag): 1883, large 8vo., pp. 516, maps and illustrations. (*Dulau.*)

The first volume of the separately published scientific results of the *Vega* Expedition was noticed in last year's 'Proceedings,' p. 446. This second volume, illustrated by 32 clearly executed plates and some woodcuts, contains the following papers:—A list, with localities, and in some few cases lengthened descriptions, of the phanerogamic flora of St. Lawrence Island on the south of the Asiatic side of Bering's Strait, and a similar one of the same great group of plants from the Western Eskimo Land, both by F. R. Kjellman; notes and studies of the mammalian fauna of the Siberian Arctic Ocean coasts, by Oscar Nordquist; a memoir on the fossil flora of Japan, by A. G. Nathorst; a contribution to knowledge of the Chukches (linguistic and anthropological), by O. Nordquist; a paper on the properties of water and ice, and contributions to the hydrography of the Siberian Sea, by O. Pettersson; a descriptive account of the *Chætopoda* (or marine *Vermes*) of the Siberian Arctic Seas and Bering's

Strait, collected during the Vega Expedition of 1878–79, by A. Wirén; magnetic observations during the same expedition, pt. i., by Aug. Wijkander; and a supplement (of 11 places) to the list of geographical positions given in the first volume, also by Arvid Lindhagen.

Pettersson's two papers (written in English) are a valuable contribution to our knowledge of Arctic hydrography. The first of them endeavours to account for the physical properties of water in the liquid and solid state at those temperatures to which ice and water are generally exposed in the Arctic Seas—the experiments being on temperatures between – 20° and + 15° C., as the changes in ice below the former and in water above the latter are almost entirely void of hydrographic interest. Abrupt changes both in saltness and temperature were found at the distance from the coast where the *Vega* passed, owing to the intermingling of the two great constituents of oceanic salt water and fresh or brackish water from the estuaries of the great Siberian rivers; but it is considered not very probable that the Siberian Sea ever attains a uniform and homogeneous composition, even at higher latitudes. The extreme cold freezes the water suddenly, whether salt or fresh, and the Arctic current eventually carries away the results so far, that when melted there is no union of the salt or fresh constituents. The existence of an ice-current from east to west is unmistakably shown by the deposits from the mouths of the Siberian rivers, which are heaped up as huge accumulations of driftwood on every shoal coast of Spitzbergen, and such ice as really melts in the Arctic Sea does not leave the water in a state favourable for diffusion, as proved by the abrupt changes of temperature noted in small depths by the *Willem Barents*.

In discussing the effects of the Gulf Stream, Pettersson suggests that it may reach further eastwards in winter, when unimpeded by the Arctic ice-masses; but he considers that the *Vega* observations result in scarcely any direct signs of its influence on the sea north of the Taimur Peninsula and Cape Chelyuskin in summer.

The maps are hydrographic, and give the Kara and Siberian seas separately with route, soundings, and various sections.

GENERAL.

Hann [Dr.] Julius.—Handbuch der Klimatologie. Stuttgart (J. Engelhorn): 1883, 8vo., pp. x. and 764, illustrations. (*Dulau*: price 15*s.*)

Published as a part of the "Bibliothek geographischer Handbücher," edited by Prof. Friedrich Ratzel, with the assistance of various specialists, this voluminous treatise is (after an introductory sketch and a discussion of climatic factors in general, and the means available for a knowledge of climate) divided into two sections, general and special climatology (the latter named climatography), The former discusses solar or mathematical climate and the typeforms of modified telluric, or so-called physical, climate; and the latter divides the earth's surface into climate-zones, tropical, north and south temperate, and polar. Various minor subdivisions are employed, and the work contains a great amount of local data as well as scientific deduction.

Ruge [Dr.] Sophus.—Geschichte des Zeitalters der Entdeckungen. Berlin (Grote): 1883, 8vo., pp. 481–542, map. (*Williams & Norgate*: price 3*s.*)

This part (contained in No. 74 of Oncken's "Allgemeine Geschichte in Einzeldarstellungen") completes Ruge's history of early geographical discoveries, noticed from time to time in our 'Proceedings.' It contains the conclusion of the third chapter (which treats of the south-western route to the Indies, Magalhães, and the first circumnavigation of the globe), with a sketch of the early contests in the Moluccas, and of the Spanish journeys of discovery in the Pacific; and the fourth and fifth chapters, which respectively discuss the attempts to discover the north-west and north-east passages to India.

The map is a coloured fac-simile of a chart of the Moluccas contained in the Portuguese cosmographer Diego Homen's parchment Atlas of 1568, in the Royal Library, Dresden.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Agram, Umgebungskarte von——. Herausgegeben von k. k. militär-geograf. Institute. Wien. Scale 1:75,000 or 1 geographical mile to an inch. Price 2*s.* (*Dulau.*)

Central Europe.—Reliefkarte von Zentraleuropa nach Möhls oro-hydrograf.- und Eisenbahnwandkarte von L. Dickert. Scale 1:1,000,000 or 13·6 geographical miles to an inch. In 2 blocks. Rheinbach, Stumm. Price 12*l.* (*Dulau.*)

Coblenz, Karte der Umgebung von——. Neue Bearbeitung von Hamricht. Scale 1:25,000 or 2·9 inches to a geographical mile. Groos, Coblenz. 8 sheets. Price 6*s.* (*Dulau.*)

France.—Carte des chemins de fer Français, par L. Thuillier. Scale 1:260,000 or 3·5 geographical miles to an inch. Hachette, Paris. Price 4*s.* 6*d.* (*Dulau.*)

——— Carte de la frontière nord-est de la——— (d'après la carte du genie à l'échelle de 1:864,000) par un ancien élève de l'École polytecnique. L. Baudoin & Co., Paris. (*Dulau.*)

Italia, Carta stradale e postale dell'——, disegnata seconde le carte e le opere più accreditate dei moderni geografi, colle attuali divisioni politiche del regno d'Italia da C. Cerri. Scale 1:864,000 or 11·8 geographical miles to an inch. Vienna. 8 sheets. Price 16*s.* (*Dulau.*)

Oesterr.-Ungar. Reiches, Karte des——, mit den Grenzen der Bezirkshauptmannschaften und Komitate, von J. Scheda. Scale 1:1,000,000 or 13·6 geographical miles to an inch. 4 sheets. Artaria & Co., Wien. Price 12*s.* (*Dulau.*)

Saarlouis, Karte der Umgegend von——. Scale 1:25,000 or 2·9 inches to a geographical mile. Berlin. 2 sheets. Price 3*s.* (*Dulau.*)

Schweiz, Wandkarte der——, von J. M. H. Ziegler. Scale 1:200,000 or 2·7 geographical miles to an inch. Wurster & Co., Zürich. 8 sheets. Price 10*s.* (*Dulau.*)

Scotland, Reduced Ordnance Maps of——, by John Bartholomew, F.R.G.S. Scale 1:127,000 or 1·7 geographical miles to an inch:—County of Sutherland. Orkney Islands. Shetland Islands. Adam and Charles Black, Edinburgh, 1883. Price 2*s.* 6*d.* coloured, 3*s.* 6*d.* mounted on cloth.

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 30th June, 1883.

6-inch—County Maps:—

England and Wales: Berks, sheets 14, 36; 2*s.* 6*d.* each. Glamorgan, Sheets 2, 3, 5; 2*s.* each. Hertford, Sheet 30 filled in with Sheet 41 (Co. Essex); 2*s.* 6*d.* Hertford, sheet 36; 2*s.* 6*d.* Derby, Quarter Sheets, 10 S.W.; 15 S.E.; 18 N.E.; 18 S.W.; 22 S.W. with Stafford 2 S.W; 23 N.E.; 23 N.W.; 24 S.W.; 25 N.E.; 39 S.E.; 1*s.* each. Montgomery, Quarter Sheets, 38 S.W. with Shropshire 54 S.W.; 1*s.* Shropshire, Quarter Sheets, 47 S.W. with Montgomery 31 S.W.; 51 N.W.; 55 N.E.; 1*s.* each.

Ireland: Longford (revised): Sheet 10; 2*s.* 6*d.*

25-inch—Parish Maps:—

England: **Bedford:** Ampthill, 7 sheets and Ar. Bk.; Flitwick, Ar. Bk.; Haynes, 7 sheets; Husborne Crawley, 5 and Ar. Bk.; Maulden, 9 and Ar.

Bk.; Millbrook, 5 and Ar. Bk.: Ridgmont, Ar. Bk.; Steppingley, Ar. Bk.; **Cornwall**: Blisland, Ar. Bk.; Landulph, Ar. Bk.; Pillaton, Ar. Bk. **Derby**: Barrow upon Trent, Ar. Bk.; Chaddesden, 8 and Ar. Bk.; Chellaston, Ar. Bk.; Mackworth, 9; Sinfin Moor, 5. **Monmouth**: Bettws, 4; Kemeys-Inferior, Ar. Bk.; Llangstone, Ar. Bk. **Norfolk**: Little Ellingham, Ar. Bk.; Morley St. Peter, Ar. Bk. **Nottingham**: Arnold, 10; Basford, 6; Bestwood Park, 8 and Ar. Bk.; Bilborough, 6; Bulwell, 5; Hucknall Torkard, 9 and Ar. Bk.; Nuthall, 5; Papplewick 8 and Ar. Bk. **Shropshire**: Badger, Ar. Bk.; Bausley (Det.), 2 and Ar. Bk.; Kenley, Ar. Bk. **Suffolk**: Aldringham with Thorpe, Ar. Bk.; Barton Mills, Ar. Bk.; Bramford, 10; Tuddenham, Ar. Bk.

Town Plans: England: Ashby de la Zouch, scale 1:528, 5 sheets, 2*s.* each. Thetford, scale 1:500, 17 sheets, 2*s.* each.

Publications issued from 1st to 31st July, 1883.

6-inch—County Maps:—

England: Berks, sheets 15, 19, 21, 35; 2*s.* 6*d.* each. Berks, sheet 10, filled in with sheet 45 Co. Oxford, 2*s.* 6*d.* Berks, sheet 1, filled in with sheet 32 Co. Oxford, 2*s.* 6*d.* Berks, sheet 17, filled in with sheet 47 Co. Buckingham, 2*s.* 6*d.* Hertford, sheet 9, filled in with sheets 7, 8, and 13 Co. Essex, 2*s.* 6*d.* Cornwall, Quarter Sheet, 21 N.E.; 1*s.* Shropshire, Quarter Sheets, 47 N.W. with Montgomery 31 N.W.; 47 S.E., filled in with Montgomery 31 S.E.; 52 S.W.; 56 S.E.; 57 N.E., 57 N.W.; 59 N.E.; 60 N.W., 60 S.W.; 62 N.E., with Montgomery 45 N.E., 62 S.E.; 63 N.E., 63 N.W., 63 S.E., 64 N.W., 64 S.E.; 65 N.W.; 66 N.W., 66 S.E.; 67 N.E., 67 N.W., 67 S.E., 67 S.W.; 74 N.E., 74 S.E.; 80 N.E.; 81 N.E.; 1*s.* each.

Ireland: Cavan (revised), sheet 20, 2*s.* 6*d.* Longford (revised), sheet 15, 2*s.* 6*d.* Meath (revised), sheet 3, 2*s.*

25-inch—Parish Maps:—

England: **Bedford**: Houghton Conquest, 7 sheets. **Monmouth**: Llangua, 4; Marshfield, 5; Michaelston Fedwy, 5. **Norfolk**: Hingham, 11. **Shropshire**: Benthall, 5; Church Preen, 5; Hughley, 5; Longnor, 6; Pattingham, 6; Willey, 7; Worthen, 33. **Stafford**: Bradley, 11, and Ar. Bk.; Church Eaton, 5, and Ar. Bk.; Hamstall Ridware and Do. (Det.), 6, and Ar. Bk.; Mavesyn Ridware, 6, and Ar. Bk.; Pipe Ridware, 3, and Ar. Bk. **Suffolk**: Cavenham, 11, and Ar. Bk.; Purdis Farm, 4.

Town Plan—5-feet scale:

Ireland: Greystones, 5 sheets.

ASIA.

Korea oder Tscho-Sen der Japaner.—Mit Benutzung der neuesten Küsten-Aufnahmen gezeichnet nach einer im Jahre 1875 vom Kriegs-Ministerium zu Tôkiô herausgegebenen Karte, übersetzt von Dr. Ernest Satow, Second Secretary and Japanese Secretary to H.M. Legation at Tôkiô. Scale 1:1,700,000 or 23·2 geographical miles to an inch. Redig. v. B. Hassenstein. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 10. Justus Perthes, Gotha. (*Dulau.*)

Palestine, Map of——. Reduced by arrangement with the Committee of the Palestine Exploration Fund; embodying as much of the Great Survey of Western Palestine as the scale allows; by T. B. Johnston. Scale 1:714,649 or 9·7 geographical miles to an inch. With Index. W. & A. K. Johnston, Edinburgh and London. Price 4*s.* 6*d.*

On comparing this map with the previous edition of Keith Johnston's Royal Atlas a marked difference will be noticed in the hill-work and courses of some of the streams; this is particularly observable in the case of the river Jordan and hills in the vicinity of Um-el-Fahm, as well as those along the coast from the Bay of Acre to Gaza. These are only given as indications of the corrections that have been made, which, however, are numerous, and will be found to exist

in nearly every part of the map, involving in some instances, changes in the Latitudes and Longitudes previously assigned. The map is accompanied by an Alphabetical Index, which greatly adds to its value, and it folds up so that it may be carried in the pocket.

Tong-King, Karte von——. Scale 1:1,800,000 or 24·6 geographical miles to an inch. Justus Perthes, Gotha. Price 1*s.* (*Dulau.*)

——————, Uebersichtskarte von——. Entworfen auf Grund der vom Dépôt des Cartes et Plans de la Marine 1881 herausgegebenen Karte von I. L. Dutreuil de Rhins und mit Benutzung der Karten von Dupuis, Maget, Romanet du Caillaud, der Hydrographie Française. Scale 1:2,000,000 or 27 geographical miles to an inch, nebst Plan von Ha-noi und Umgebung, scale 1:114,000 or 1·5 geographical miles to an inch. Redigirt von R. Kiepert. Berlin, D. Reimer. Price 1*s.* (*Dulau.*)

Tonkin, Carte du——, publiée avec l'autorisation du ministre de la marine et des colonies, par M. A. Gouin. Paris, Challamel, aîné. Price 3*s.* 6*d.* (*Dulau.*)

AFRICA.

Blauen Nil, Originalkarte von Juan Maria Schuvers Forschungen am—— und in den Gebieten östlich von Famaka, in den Jahren 1881 und 1882. Scale 1:500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 72. Justus Perthes, Gotha, 1883. (*Dulau.*)

Egypt, Map of portions of Middle and Upper——. Sheet 6. Scale 1:200,000 or 2·7 geographical miles to an inch. Compiled at the Intelligence Branch, War Office, in 1883, principally from the Surveys made by the Egyptian General Staff and Mr. John Fowler, C.E. Lithographed at the Intelligence Branch, War Office, June 1883.

Egyptian Sûdan, Map of the——. Scale 1:2,253,080 or 30·8 geographical miles to an inch. Compiled and lithographed at the Intelligence Branch, War Office, 1883.

This map includes all the country between latitude 2° N. and 20° N., and longitude 25° E. to 37° 40′ E.; it has been compiled with great care, and contains the results of all recent explorations. It is by far the most perfect map of the Egyptian Sûdan that has yet been produced.

Zambese und Schire, Neue Portugiesische Aufnahmen am unteren——, von Affonso de Moraes Sarmento (1877–1880) und der Expedition unter Paiva d'Andrada (1881). Scale 1:1,500,000 or 20·4 geographical miles to an inch. Redigirt von Richard Kiepert. Zeitschr. der Ges. f. Erdk., Bd. XVIII., Taf. IV. D. Reimer, Berlin, 1883. (*Dulau.*)

In addition to the survey of the Zambesi and Shire rivers, made by Sr. Alfonso de Moraes Sarmento and the expedition under Sr. Pavia d'Andrada (1881), there is an inset map on which the courses of these rivers, as laid down in this map, and that of Eastern Equatorial Africa, compiled by Mr. E. G. Ravenstein, are given, showing considerable discrepancies in the lower course of the Zambesi, and the position of the Shire; it may, however, be remarked that these discrepancies occur in the longitudes assigned, and longitude has always proved to be a very uncertain quantity in preliminary surveys; the latitudes, however, of all the chief points very nearly correspond; and it would seem, from the contradictions to be found in the surveys which have already been made by Portuguese officers, that we may yet look forward to considerable alterations and corrections in the cartography of these rivers. A reference to the remarks contained in Vol. IV. p. 254 of this Society's 'Proceedings,' on the Portuguese surveys of this district, will convey some idea of the difficulties which the geographer has to overcome when compiling a map of the Zambesi country.

Mr. E. G. Ravenstein in his map has adhered to the longitudes computed by the late Astronomer Royal at the Cape of Good Hope (Sir T. Maclear) from

sets of lunar distances observed by Dr. Livingstone, and in the face of the discrepancies contained in the surveys of the Portuguese officers, seems to have been of opinion that there existed no sufficient grounds to ignore the results of Dr. Livingstone's observations.

AMERICA.

Arctic Regions.—Die ehemalige Verbreitung der Eskimos im arktisch-amerikanischen Archipel. Scale 1 : 11,000,000 or 150·6 geographical miles to an inch. Zeitschr. der Ges. f. Erdk. zu Berlin, Bd. XVIII., Taf. 2. D. Reimer, Berlin, 1883. (*Dulau.*)

—— —— Küste des Arktischen Amerika von 75°–104° W. L. v. Gr. zur Darstellung der Eskimo-Wohnsitze und ihrer Verbindungswege. Zeitschr. d. Ges. f. Erdk. zu Berlin, Bd. XVIII., Taf. 3. D. Reimer, Berlin, 1883. (*Dulau.*)

Brackebusch, L.—

Mapa de la provincia de Jujuy. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch.

Mapa de la parte meridional de la provincia de Salta. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch.

Croquis de la Laguna de la Brea, provincia de Jujuy. Scale 1 : 50,000 or 1·4 inches to a geographical mile.

Stiller and Laas, Buenos Aires, 1882. (*Dulau.*)

Lallement, G. Avé.—Mapa de la provincia de San Luis levantado et dibujado bajo los auspicios del Instituto Geogr. Argentino. Scale 1 : 400,000 or 5·5 geographical miles to an inch. Stiller and Laas, Buenos Aires, 1882. (*Dulau.*)

Northern Transcontinental Survey (U.S.A.).—

Map of Yakima Region, Washington Territory. Scale 1 : 127,000 or 1·7 geographical miles to an inch. 2 sheets, Eastern and Western.

Map of Colville Region, Washington Territory. Scale 1 : 127,000 or 1·7 geographical miles to an inch.

Map of Crazy Mountains and vicinity, Montana Territory. Scale 1 : 127,000 or 1·7 geographical miles to an inch.

Map of Judith Basin, Montana Territory. Scale 1 : 127,000 or 1·7 geographical miles to an inch. 2 sheets, Northern and Southern.

Northern Transcontinental Survey, Raphael Pumpelly, Director. Department of Topography, A. D. Wilson, Chief Topographer, 1882.

AUSTRALIA.

South Australia, Map of——, showing the Telegraph Lines, 1882. Scale 1 : 1,168,000 or 16 geographical miles to an inch. With an enlarged plan showing lines within a radius of 27 miles from Adelaide, and an inset map of Australia, showing Trunk Lines of Telegraph. Compiled by W. H. Abbott under the direction of Charles Todd, C.M.G., F.R.A.S., Postmaster-General and Superintendent of Telegraphs. E. Spiller, Government Printer, Adelaide.

—— —— Map of Country between Adelaide and the Sea Coast for Military Purposes. Compiled in the Surveyor-General's Office, Adelaide, 1882. Scale 1 : 20,000 or 3·6 inches to a geographical mile.

—— —— Map showing the Area Cultivated for Wheat in South Australia from 1870 to 1882, the Quantity of Wheat reaped, and the Average Yield per Acre in bushels and pounds; also, the Area of each District; the Area Sold, either for Cash or on Credit, to March 31st, 1883; the Area Leased (exclusive of Pastoral Leases) to same date; the Horses, Cattle, and Sheep on the Land in March 1882; and the Population in April 1881. Compiled by C. S. Wright, Secretary to the

Honorable the Commissioner of Crown Lands, and Photo-Lithographed at the Surveyor-General's Office, Adelaide. 4 sheets. Scale 1 : 390,000 or 5·2 geographical miles to an inch.

—— —— Copy of Rough Plan showing explorations by Mr. Winnecke, prepared in the Office of the Surveyor-General, Adelaide, 1882. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch.

—— —— Adelaide. Scale 1 : 63,360 or 0·86 geographical mile to an inch. Surveyor-General's Office, Adelaide, 1882.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in May, June, July, and August 1883.

No.			Inches.	
163	m	=	1·2	Sardinia, north-east coast :—Cape Ferro to port Brandinchi, including the gulfs of Congianus and Terranova, with the adjacent ports and anchorages. Price 1*s.* 6*d.*
1189	m	=	1·2	Mediterranean :—Bonifacio strait. Price 2*s.* 6*d.*
1233	m	=	6·0	Black sea :—Kustenjeh anchorage. Price 1*s.*
469	m	=	14·3	Spain, south coast :—Port of Alicante. Price 1*s.* 6*d.*
286	m	=	1·0	Newfoundland, east coast :—Canada bay, with the adjacent anchorages. Hilliers harbour. Grévigneux and Aiguillettes harbours. Gouffre and Canaries harbours. Otter cove. Price 1*s.* 6*d.*
97	m m	= =	2·0 3·0	South-western Pacific ocean :—Anchorages in the Solomon islands. Price 1*s.* 6*d.*
2672	m	=	3·0	Japan :—Hakodate harbour. Price 1*s.* 6*d.*
1331	m	=	0·9	South America, east coast :—Port Belgrano. Price 1*s.*
2548	m	=	1·1	Spain, west coast :—Vigo bay. Price 1*s.* 6*d.*
2322	m	=	1·37	North Sea :—Scheveningen to Ameland, including the Zuider Zee. Price 2*s.* 6*d.*
441	m	=	0·2	Fiji islands :—Eastern archipelago, southern portion. Price 2*s.* 6*d.*
893	m	=	0·4	Newfoundland, south coast :—Burin harbour to Devil bay, including Miquelon islands and Fortune bay. Price 2*s.* 6*d.*
1911	m	=	0·29	North America, west coast :—Juan de Fuca strait. (Plans, port San Juan, Neeah bay.) Price 1*s.* 6*d.*
2508	m	=	1·68	Gulf of Tartary :—Barracouta harbour (port Imperial). Price 1*s.*
595	m m	= =	0·4 1·67	South Atlantic ocean :—Trinidad and Martin Vas islets. Price 1*s.*
1947	m	=	0·28	North America, west coast :—Admiralty inlet and Puget sound. Price 1*s.* 6*d.*
1047	m	=	0·1	Australia, north-west coast :—Cape Ford to Buccaneer archipelago. Price 3*s.*
81	m	=	2·7	Sumatra, south coast :—Telok Betong. Price 1*s.*
2059	d	=	0·4	North Atlantic ocean. Price 2*s.*
2203	d	=	0·4	South Atlantic ocean. Price 2*s.*
1199	m	=	0·25	China :—Kweshan islands to the Yang-tse-Kiang, including the Chusan archipelago. Price 3*s.*
1329	m	=	0·3	South America, east coast :—Bahia Blanca to Union bay. (Plan, Union bay). Price 2*s.*
440	m	=	0·2	Fiji islands :—Eastern archipelago, northern portion. Price 2*s.* 6*d.*
692	m	=	0·85	Madagascar, west coast :—St. Augustine and Tullear bays. Price 1*s.*

No.			Inches.	
1480	m	=	0·25	China:—Yang-tse-Kiang, from the sea to Naking. Price 2*s.*
453	m	=	0·75	Red sea:—Jebel Zukur and Hanish islands. Abu Ail channel. Zebayir islands.
	m	=	1·96	
2554	m	=	2·85	Italy, west coast. Leghorn (Livorno) roadstead.

71*a* Plan added, Cocanada or Coringa bay.
1192 Plans added, Eyemouth; Newbiggin bay.
134 Plan added, Espiègle bay.
97 Plan added, Alite harbour.
1056 Plan added, Gascoyne road.
2717 Plans added, Herradura, Berengueles, Escullos, bays. Marbella, Nerja, anchorages.
911 Plans added, Bara bay. Uki road. Gunong Sudi anchorage.
957 Plan added, Canalasan cove.
(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
163	Ports and anchorages on north-east coast of Sardinia	New chart, Cape Ferro to port Brandinchi	163
1189	Bonifacio strait	New chart, Bonifacio strait ..	1189
1233	Kustenjeh anchorage	New plan, Kustenjeh anchorage ..	1233
469	Port of Alicante	New plan, Port of Alicante ..	469
97	Anchorages in the Solomon islands	New plan, Anchorages in the Solomon islands	97
2672	Hakodadi harbour	New plan, Hakodate harbour ..	2672
1331	Port Belgrano	New plan, Port Belgrano	1331
2548	Vigo bay	New plan, Vigo bay	2548
81	Coringa or Cocanada bay	New plan, Cocanada or Coringa bay on chart	71*a*
2322	Zuider Zee	New chart, Scheveningen to Ameland	2322
1911	Juan de Fuca strait, with Admiralty inlet and Puget sound ..	New chart, Juan de Fuca strait ..	1911
1910	San Juan port, Duncan rock, and Neeah bay		
2508	Barracouta harbour or Imperial port	New plan, Barracouta harbour (port Imperial)	2508
1947	Puget sound	New chart, Admiralty inlet and Puget sound	1947
1047	Cape Ford to Buccaneer archipelago	New chart, Cape Ford to Buccaneer archipelago	1047
1049	Cambridge gulf		
2059	North Atlantic ocean	New chart, North Atlantic ocean	2059
2203	South Atlantic ocean	New chart, South Atlantic ocean	2203
1199	Hieshan islands to the Yang-tse-Kiang, including the Chusan archipelago	New chart, Kweshan islands to the Yang-tse-Kiang, including the Chusan archipelago	1199
1329	Union bay	New chart, Bahia Blanca to Union bay	1329
692	St. Augustine bay and Tullear harbour	New plan, St. Augustine and Tullear bays	692
1480	Yang-tse-Kiang	New plan, Yang-tse-Kiang	1480
2554	Leghorn	New plan, Leghorn roadstead ..	2554

Edward Weller, *Red Lion Square*

PROCEEDINGS

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AND MONTHLY RECORD OF GEOGRAPHY.

On the Athabasca District of the Canadian North-West Territory.

By the Rev. Émile Petitot.

Map, p. 688.

Some nine years ago, I wrote a short paper on the Fur District of Athabasca, which was inserted in the Bulletin of the French Geographical Society for July–September 1875, and was also twice published separately. My subsequent journeys on the Upper Athabasca river and a stay of some months on the lake of the same name, have enabled me to collect fresh topographical, statistical, and historical material on this great district of the Canadian North-west; so that I have had to recast my former account in order to interpolate these recent acquisitions as well as my personal observations.

It will be needless to refer to the works of the first explorers of the region, such as Hearne, Mackenzie, Franklin, Back, Richardson, and others, or even to the more recent 'Wild North Land' of Captain Butler, as the commercial district of Athabasca, which takes its name from the river and lake, has undergone so many modifications during the last decade. In 1879, the Hudson's Bay Company joined a considerable portion of the Lesser Slave Lake and Mackenzie districts to the old Athabasca district, and its boundaries were defined by the dismembered and modified Mackenzie district on the north, the Churchill district on the east, the English River on the south, the Upper Saskatchewan on the south-west, and British Columbia on the west.* From the Buffalo

* It should be observed that since M. Petitot's return to France, Athabasca has been re-defined as one of the four districts of the Prairie Section of the North-West Territories, by order of the Privy Council of Canada dated the 8th May, 1883, in the following words:—"4th. Athabasca. The district of Athabasca, about 122,000 square miles in extent, to be bounded on the south by the district of Alberta; on the east by the line between the 10th and 11th ranges of Dominion Lands townships before mentioned [i. e. the line dividing the 10th and 11th ranges of townships numbered from the fourth initial meridian of the Dominion Lands system of survey, or about 111° 30′ W. long.] until in proceeding northward that line intersects the Athabasca river; then by that river and the Athabasca Lake and Slave River to the intersection of the last with the

River, a southern affluent of the Great Slave Lake, the entire shore of that inland fresh-water sea up to and including the two Fonds-du-Lac on the east, belongs to this district; and Forts Resolution and Reliance, which are contained in it, are subordinate to Fort Chipewyan, the headquarters.

If a straight line be drawn from Fort Reliance (situated at the outlet of Artillery Lake, the mouth of the great river "Tpa-tchégé-tchôp," whose current is as perceptible across Slave Lake as that of the Slave River) to the 105th meridian, and the latter followed to its intersection with the 61st parallel, the most easterly limit of the district is then defined. This imaginary line here meets a chain of crystalline rocks, belonging to the Laurentian system, which divides the basin of Hudson's Bay from that of the great interior lakes; and as this chain is the highest land in this region it serves as a natural boundary between the Athabasca district and the districts of the English River and Upper Saskatchewan. The Athabascan frontier leaves this chain a little to the east of La Biche (or Red-deer) Lake, and follows the 55th parallel to the Rocky Mountains, thus cutting the old district of the Lesser Slave Lake, in which Forts Assiniboine and Jasper are subordinate to Edmonton House, the headquarters of the Upper Saskatchewan. Then following northwards the great Cordillera, which is the natural western limit of the district, the frontier reaches beyond the Mountain River Portage, and comes again to the Great Slave Lake by a line passing between the nearly parallel courses of the Peace and Hay rivers.

The Athabasca district comprises two great rivers, and two great fresh-water basins. The rivers are the Athabasca (better known locally by the Canadian name of La Biche, meaning Red-deer or Elk River) and the Peace River (also called "Des Castors" or Beaver River). The junction of these two forms the noble stream which, after connecting the Athabasca and Great Slave Lakes, takes the name of the Mackenzie. Its Indian names, which it preserves throughout its whole course, are "Dèsnézé" or Great River, and "Na-otcha-Kotchô" or River with giant banks. The lakes are the Athabasca (the "Lake of the Hills" of Hearne) and the Great Slave Lake (in Chipewyan, "Lake of the Crees").

To the chief topographical features of this district, I propose to add my own observations on the nature of the soil and its products, statistics of the population, and some historical speculations, and I shall follow in these the natural direction of the waters, from south-west to north-east.

I.

The most southern source of the Athabasca river is in the Rocky Mountains, in a little lake at the foot of Mount Brown, 16,000 feet high,

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northern boundary of the district, which is to be the 32nd correction line of the Dominion Lands township system, and is very nearly on the 60th parallel of north latitude; westward by the Province of British Columbia." This district is of larger area than Great Britain and Ireland.

not far from the sources of the Saskatchewan, Fraser, and Columbia rivers, and a little south of the Yellow Head Pass. I do not know the exact length of the Athabasca from its source, but it cannot be less than 500 or 600 miles. There are 240 miles of its Slave River course from Fort Chipewyan to Fort Resolution on the Great Slave Lake, and the Mackenzie is reckoned as 1045 miles; this would give nearly 2000 miles for the entire river system.

From its source to the confluence of the Clear-water ("Washé-Kamaw" in the Cree dialect, but more commonly called "Sipisis" or Little River) the general direction of the Athabasca is from south-west to north-east; from that point, after two very abrupt angles to the east and south-east, it goes almost straight north to the Athabasca Lake.

For my purpose, we are only interested in the river after its receiving the drainage of the Lesser Slave Lake, at which point it enters the district of Athabasca. Before that point it receives five small rivers, the Miette, Bonhomme, Baptiste, Macleod, and Pembina. This last name, or rather "Nipi-mina," is a Cree word for elk-berries (the fruit of a guelder rose, *Viburnum edule*, which grows there).

I should observe that the name Elk River, applied to the Athabasca, is not only unknown in the north-west, even to British settlers, but is incorrect, since it refers to the elk (moose) or "orignal" (*Alces americanus*), whilst the Athabasca bears the name of the "cerf bossu" of Canada (the wapiti),* called "biche" by the Canadians (the name of the female). The Crees call the wapiti "Wawaskisieu," and the Chipewyans "Thé-zil," or Reindeer of the Rocks, both tribes also applying these names to the great water system of which I am treating, and which should therefore be called the Great Red-deer River.

A little below the outlet of the drainage of the Lesser Slave Lake, the Athabasca receives the waters of another river, also called La Biche, which drains the pretty lake of the same name. Still lower, on the right bank, are the confluences of the Crying River ("Kitou Sipi") and Wide River ("Kaministi Kwéya"), and on the left bank the Pelican River ("Tsatsakin Sipi"), and Lake Wabasca. The right bank also receives the Houses River ("Waskaigan Sipi"); then, before reaching the turbulent cascades and foaming sheets called the Great Rapid, the right bank is again broken by the "Miyotinaw," and the left by the "Nistaukam" (Mustuch or Bison River), whilst another Red-deer or La Biche River, at least the sixth of the name in the district, also enters the Rapid on the left bank.

The large Clear-water river affluent is called "Otthap-dès," or River of the Groves, by the Chipewyans, and "Little Athabasca" by the Canadians. Inclosed between sandy banks 400 feet high, which it washes and eats away, revealing base rocks of the most picturesque character conceivable, this fresh and limpid stream is literally buried

* It is a common error in North America to call the wapiti by the name of elk.

under the natural bowers of vegetation following its shores and climbing the walls of its cañon. Nowhere have I seen more pleasing views, more crystal and yet impetuous waters, more turbulent rapids and cascades, or more shady and varied woods. Its bed is covered with fresh-water mussels (*Unio*), which, however, the Indians do not eat, and its forests contain moose and bear. A pretty spring of sulphurous and saline waters rises from five different sources in the prairie near the river, and could be made the site of an excellent sanitary bathing establishment.

A trading post called The Forks is situated at the junction of the Clear-water with the Athabasca.

Beyond the Clear-water, the latter receives on its right bank the Saline and Pierre-à-Calumets rivers, and on its left bank the Beaver, Red, and Cypress rivers.

The sandy banks of the Athabasca vary from 200 to 400 feet in elevation, and present many formations, all apparently belonging to the transitional epoch.

Below the drainage of Lake La Biche and Wide River, on the left bank, a red-coloured exposure of the schistose and oblique stratifications which dip into the muddy current suggests the action of ancient subterranean fires, called "Boucanes" by the Canadians. Here are found sulphates of iron and magnesia, nitrous deposits, and native carbonate of soda. In one place along the miry bank, a number of jets of hot steam find a vent through the mud, and make the waters of the river bubble. These traces of plutonic action are then transferred to the right bank, both above and below the confluence of the Clear-water, where there is a chain of volcanoes on a small scale, in the form of little cones of whitened and scorified earth. Beyond these places, indications of active and extinct igneous action are only found on the right bank of the Athabasca and Mackenzie system, reappearing all along this immense fluvial artery with an intermittent activity and inaction difficult to explain. In some places these "Boucanes," after having vented fire and smoke for decades, entirely disappear, only to show themselves without apparent cause elsewhere.

Traces of the subterranean bituminous veins that keep up these fires can be followed to the shores of the Arctic Ocean, in the cliffs of Franklin Bay and Cape Bathurst, where Sir John Richardson took them to be active volcanoes.

These "Boucanes" are usually found on the line of imperfect coal, i. e. of deposits of lignite incompletely carbonised, and consequently unfit for the forge or fuel. They are so along the Boucanes River, one of the affluents of the Peace River, as well as above Fort Norman on the Lower Mackenzie; but here there is no outer trace of coal or lignite, though it is probable that there are subterranean veins of those substances, and that the phenomena mentioned are owing to the protocarbonated hydrogen of the coal deposits. Nevertheless (although fire-damp explodes on con-

tact with oxygen, as is often found at the beginning of winter in some of the lakes of the north-west), the capability of spontaneous illumination which Richardson attributes to the identical exhalations of Fort Norman, has not been found to exist in this gas. It is impossible to attribute to the Indians the extinction of the fires of bituminous schists in the Athabasca-Mackenzie system. Their ignition is intermittent, without apparent cause, and unstable. It is, moreover, accompanied by a strong smell of petroleum, whilst hydrogen is inodorous. But the carburets of hydrogen, of which petroleum is composed, do not make it, any more than they do fire-damp, spontaneously inflammable, even on contact with air,—in spite of received scientific opinion. We must, therefore, consider them as one of the effects of igneous action, materially connected with the fire of the volcanoes; for the Boucanes occur under similar conditions to the vents of these subterranean fires, being found on the river banks, on intermediary strata inclosing schist, bitumen, lignites, thermal sulphurous or saline waters, rock-salt, &c.

I have observed a saline spring near the confluence of the Clear-water; a little below this point the Athabasca receives a saline feeder, which rises in a natural salt spring of considerable size; and below Lake Athabasca, on the left bank, is a second saline feeder, rising in the Caribou Mountains, which contain vast deposits of rock-salt and a cavern remarkable for its crystalline concretions.

Still further, between Forts Simpson and Norman, two other saline streams, unfit for drink, are fed by the mines of rock-salt contained in Clarke's Rock, a mountain of volcanic aspect. Lastly, there is a fifth saline river not far from the Arctic Ocean.

About 56° 30′ N. lat., the Athabasca meets Birch or Bark Mountain, a continuation of the heights forming Portage-la-Loche or Methy Portage (named after the Loche or fresh-water cod-fish), and leaves its former course in order to open a way across the ravines of the mountain, thus making a right-angled elbow to the east. This wonderful cañon is called the Great Rapid. For some 25 to 28 leagues it impedes and much endangers the navigation of the Athabasca. Besides the Great Rapid, properly so called, the traveller must pass as best he may the Brûlé, Noyé, Pas-de-bout, Croche (or Sinuous), Stony, Cascade, and Mountain rapids. In short, the whole make one continuous rapid, twice as long as that of the Bear River, for the current sometimes reaches a pace of 12 to 15 miles an hour.

There is, nevertheless, strictly speaking, no cataract in the Athabasca cañon, only a very strong declivity, in the form of a rapid flat sheet of water, obstructed by enormous boulders. At its commencement the river finds itself checked by the vast natural dam of Bark Mountain, the base of which is sandstone or madreporiferous limestone. The raging flood dashes against this obstacle, in which it has striven to batter a breach for centuries, washing away and carrying off the quartzose

particles and exposing the madreporic conglomerate, shelly limestone, or bituminous sandstone forming the base of this vast deposit, and detaching and isolating a multitude of globular masses of solid or hollow sandstone contained in the quartzose sand, which now obstruct the bed of the river and are the cause of its foaming rapids. These concretions are found at every elevation of the cliffs, from the size of a coat button to that of a Dutch fishing vessel; they are of all degrees of measurement and bulk, and of elegant or grotesque shapes, from buttons and turnips to the planet Saturn with its rings.

I have never seen in any geological text-book an explanation of the formation of these lenticular concretions, geodes, or pisolites, which I cannot believe to be merely concretions of sandstone rolled and rounded by the action of water. I am inclined to the opinion that they are masses thrown up in a globular form by some subterranean igneous force, and falling into water holding much mud in solution, in which they have passed from a pasty condition to a solid consistency, crystallising as it were in it by the action of cold. I adopt this view, because these pisolites (whether geodes or not) are only met with in this district near rapids and waterfalls, in localities exhibiting numerous traces of subterranean fires, formerly much more active and powerful than now; and because I have found some of these concretions composed of iron pyrites, crystallising from the centre outwards, and also others of bog iron. Whatever may be the method of formation of such singular freaks of nature, the Athabasca in eroding a tortuous and deep channel through the sandstone of Bark Mountain, finds its bed obstructed by these gigantic concretions, which are the sole cause of its rapids and render its navigation so perilous as to be well-nigh impossible. Besides this danger, great numbers of them are exposed on the sandy surface at all heights of the cliffs, forming immense caps constantly threatening the heads of the unsuspecting travellers beneath.

Remarkable vegetable fossils are often found in the sandstone of this part of the Athabasca, imbedded in the rock but capable of detachment with the hammer. I have noticed whole trunks of *Cupressoxylon* (probably a *Sequoia*), characteristic of the tertiaries, and have sent specimens of it to Montreal and Paris.

Near the Clear-water, pudding-stone begins to appear in horizontal layers from the level of the water, probably also reaching below it. This conglomerate is here overlaid by oblique stratifications of bituminous schist, which transude asphalt from top to bottom. The savannas and swamps covering the surface of these rocks conceal rich mines of bitumen under their thin coat of turf; and from Point Colbert to the Pierre-à-Calumets river they have given rise to the Chipewyan name of "Ellel' Dèssé," or "River of the moving grounds."

The proximity of pisolites and considerable deposits of quartzose sand leads me to the belief that the bituminous matter exuding from

the black cliffs of the Athabasca is *Pisasphaltum areniferum*, characteristic of the tertiaries. It flows in summer in wide sheets from the schistose flanks of the cliffs down into the river, mixing with the sands and solidifying so as to form a conglomerate sometimes softened by the sun's rays and at others hard and brittle, of which fragments detached by the waters are carried down and deposited on the shores of the Athabasca-Mackenzie system, where they could be mistaken for nodules of basalt. They acquire an astonishing degree of hardness, and it is only by accident that their true origin is eventually discovered.

The bituminous schists are replaced at intervals by a shell-bearing limestone of dolomitic tendency, sometimes milky white. From this I have extracted various fossils, including *Terebratulæ*, very small Belemnites, *Atrypa reticularis*, *Cyrtina hamiltonensis*, and *C. umbraculosa*. These limestone strata are undulating, and occur both above and below the water-level.

The shores of the Athabasca present an attractive sight. Far from injuring plant life, the presence of naphtha and the subterranean fires seem to have imparted new vigour to it, so that the lofty banks have their steep slopes covered with vigorous and varied vegetation. Besides white pine, larch, aspen, and birch (which gives its name to the Bark Mountain), the forest trees here include Virginian pine, cypress, Banks's pine, Weymouth pine, balsam-poplar, alder, and many kinds of willow.

Along its waters, discoloured by muddy matter and loaded with deposits to such an extent as to be prejudicial to fish-life, I have collected a large number of medicinal plants: *Geum strictum* and *rivale*, *Verbascum*, *Elæagnus argentea* (a very sweet-smelling shrub whose berries are a great delicacy to bears), *Lonicera parviflora*, *Cypripedium* with its large golden lips, saxifrages, *Polygala*, *Erythronium dens-canis*, and beautiful scarlet lilies, like the Martagon, which would be an ornament to any garden. The Indians are very fond of the bulbs of this latter plant, which the Tinney * call "Télé-nuié" (or Crane bread) and the Crees "Okitsanak." The eatable *Hedysarum* with blue flowers and the poisonous one with yellow (known as the Travelling Vetch) are found there also. The male fern adorns the woods with its large fronds, and others, such as *Polypodium*, Capillary, and *Scolopendria*, carpet the mossy rocks with their elegant plumes. But the most abundant plant all along the river is sarsaparilla. The Tinney of the Beaver tribe know this smilaceous plant as a febrifuge and sudorific, and collect its roots; but they are not aware of the anti-syphilitic properties of smilacine, a tannic base contained in it, and which I have more than once pointed out to them.

It is a curious fact that I have never heard a *Cicada* in the North-west, though on two occasions (in 1876 and 1879) I satisfied myself of

* Also variously written as Tinneh, 'Tinnè, 'Dtinnè, Dinnè, Dinè, Dinneh, Dènè, &c. (meaning "men" or "people")—the great northern or Athabascan family of Indians.

the occurrence of those insects at the junction of the Clear-water and the Athabasca, though I only found them at that spot.

The wapiti has become rather uncommon in the forests of the Athabasca, but the moose is frequently met with there. I have never travelled along this noble river (and I have done so six times) without seeing it, sometimes as many as three individuals together. The frugivorous black bear, lynx, beaver, and otter are common. On June 23rd, 1879, I met two Cree hunters who declared that since the spring (i. e. in less than three months) they had between them killed along the river 200 beavers, 25 moose, 20 bears, and five wapiti; and I may add that from experience of the Redskins I know they are more given to diminish than to exaggerate the results of their hunting. This shows that life could still be maintained on the river if there existed inhabitants able to hunt and provision the trading posts. But from the drainage of the Lesser Slave Lake to Lake Athabasca, there are but 31 Crees and 22 Chipewyans, women and children all told.

The original mouth of the Athabasca is now distant a good day's navigation from the lake. It is shown by the simultaneous receding of both the high strands forming the bed of the river, which from this point keep widening away from each other until they disappear in the interior. A flat uniform plain follows, composed of accumulations of soil with no mixture of rock and covered by dense forest growth. The river has thus actually filled up its own ancient estuary with the material it has carried along, for no other in the world is more loaded with muddy deposits, vegetable detritus, and floating trees.

Almost immediately after this, the river divides into two arms, of which only the right-hand one retains the name of Athabasca, the left taking that of Embarras, because of the frequent bars made across it by the timber borne on its waters. Further on, the Athabasca channel is subdivided into three other branches, of which the central was the principal channel in 1879, whilst the left one, known as the Brochets (or Pike) River, rejoined the Embarras branch. But all these channels are interconnected by a multitude of creeks, not reckoned by the natives, as they are only navigable by bark canoes.

Some maps make the river Athabasca communicate with Lake Mamawi (or Mamawa), which is also represented as an expansion of one of the mouths of the Peace River; but this is a double error. Lake Mamawi (meaning in Cree, Reunion or Assemblage) receives its waters from Clear Lake, with which it communicates by a very short arm called the Hay River ("Klopè-djiéthé"); and Clear Lake itself is fed from Bark Mountain, having no connection with the Peace River. But before entering Mamawi, the waters of Clear Lake bifurcate, the left channel discharging under the name of the "Des Enfants" or Children River, into the most eastern mouth of the Peace River, called "Aux Œufs" or Egg River, which flows into Lake Athabasca.

The waters of Mamawi are also drained into the latter basin by four channels, of which the right-hand one passes direct into it, the other three eventually uniting and emptying into the eastern mouth of the Peace River, which before reaching Lake Athabasca sends out an arm towards Lake Mamawi. This quadruple channel bears the name of the Four Forks, and is the cause of the Cree name for Mamawi. Very curious tidal fluctuations result from this formation. In ordinary weather, with things in their normal condition, the above description is correct. But as the level of Lake Athabasca is materially heightened at the period of flood, the waters of its basin, or more correctly the currents of the Athabasca which cross it, flow back in the direction of the Four Forks, reaching Lake Mamawi and even Clear Lake itself, so that they connect the first with the eastern or Embarras channel of the Athabasca, and inundate all the prairies between the different mouths of that great river, forcing the Egg River to flow back to the main branch of the Peace River which joins the Great Slave River.

Such was the condition of the estuary of the Athabasca and its mouths in Franklin's time (and also in 1876); and if there are errors in the maps of that time, they are either owing to incorrect information or to misunderstanding; for I can scarcely believe that the first explorers were able to visit all these localities, considering the short time they spent in the country.

The vast marshy savanna of this delta—an ocean of tall grass, mare's-tail, *Cyperus*, reeds, and willows, intersected by numberless miry creeks always covered with water-fowl—is well called in Cree "The Herbaceous Network," which is practically the meaning of Athabasca, Ayabasca, Arabasca, and Wabasca, in the Algonquin dialects,—a name applied to the entire lake and also to the river by Europeans.

There are often not more than two or three feet of water in these creeks of the Athabasca; but sometimes the whole estuary is submerged and becomes part of the lake, still bearing on its muddy surface a flotilla of huge trees which have got locked together and materially heightened its level. I saw such a state of things in 1871 and 1876; but how different was the estuary three years after! At that time, the channels of the Athabasca were almost dry; the main current had left the central one and gone wholly to the east, and the savanna of the estuary, elevated many feet above it, was changed into an immense and perfectly firm prairie, covered with young willow copses and dotted with water-holes.* But the most remarkable thing was that the estuary of the Athabasca had entirely left this high and dry prairie, and betaken itself to a point between its old mouth and that of the Peace River, into the Rocky (or Stony) River, the drainer of the great lake. The expanse of waters between these two points had therefore vanished, and the once great bay of Lake Athabasca, so picturesque with its chains of granitic

* See Macoun, in Rep. Geol. Survey Canada, 1875–76, p. 91.

pine-clad isles, like a fleet of war-ships preparing for nautical evolutions, had wholly disappeared. Perhaps I should more correctly say that this basin of five to six leagues still existed with its rocky rim, but instead of water it contained grass; instead of resembling a vast turquoise set in a jasper border, it seemed an emerald, silver-veined. This part of the lake was also transformed into a prairie, from Bustard Island to the Rocky River, and its former islands, now surrounded by fertile land, only lacking the plough to produce splendid crops, were mere isolated elevations—landmarks destined in future ages to show that once the white fish, carp, and pike disported in places destined I hope to be improved ere long by high cultivation.

This condition of the waters endured till I left the North-west; for in 1881, Mr. R. M'Farlane wrote to me that this drying-up had proved a severe calamity to the Redskins of the lake, who had hitherto derived plentiful supplies of food from the well-known fisheries of the Four Forks and Bustard Island, now of course entirely destroyed.

It seems that the four mouths of the Athabasca, the embouchure of Lake Mamawi, and the eastern (or Egg River) channel of the Peace River, retained their respective currents beneath the waters of the lake before filling it up; and when the level of the lake had become considerably heightened by their numerous interconnections, their beds remained like so many narrow rivers, which now run through the dried-up mud, far from the ancient isles, to reunite in the great outlet of the Rocky River.

Unless some extraordinary flood remodifies this newly formed estuary, the Athabasca district will thus have gained an immense space of land, excellent for cultivation, and not requiring artificial fertilisation for very many years; and it should be noted that the climate of the lake is far from being an obstacle to the ripening of cereals and vegetables, for at the Philadelphia Centennial Exhibition in 1876, the Catholic Mission near Fort Chipewyan obtained a silver medal and honourable mention for cereals of the first quality and remarkable size. In fact, the chief want of the lake district as regards colonisation is vegetable mould. With the exception of the estuary above mentioned, and of the still more extensive and no less extraordinary one of the Peace River, only rocks are found in it; and it may be said with truth that the entire north from the Slave Lake and River to Hudson's Bay is only a gigantic bed of crystalline rocks, where the planetary nucleus is exposed under the form of various granites, felspar, syenite, porphyry, serpentine, &c. Vegetation is only to be seen in the inequalities of the stony surface or depressions in these products of fusion, where the action of water has not entirely cleared away their sandy surface, or where it has deposited a slight layer of sedimentary earth, as at the Chipewyan Mission. Conifers, black alder, heather, *Cistus*, *Absinthium*, and some other aromatic plants root in the meagre

soil, and diminish the melancholy aspect of this vast exposed portion of the frame of nature.

I firmly believe that all the ground reclaimed from the Peace and Athabasca rivers is of the best quality, if the present conditions are maintained. But there is always the fear of some exceptional rise in the waters causing a sudden flood, of such a nature that the vast plains recently uncovered might be once more overrun by devastating currents washing away their soil and entirely re-modifying their surface.

I have travelled over the whole of the estuary of the Peace River* above referred to, and found it no less curious than that of the Athabasca. As before mentioned, its first or most eastern channel enters Lake Athabasca at the Four Forks, under the name of Egg River; and the maps are quite wrong in representing the Clear Lake River as another mouth of the Peace River. But between the Egg River and the Canard or Duck Portage, where there are unmistakable traces of an old western channel, this river has four other openings into the Slave River, without counting six creeks, originating in the same number of lakes formed by the overflow of the Peace River, but with no currents of their own directly its waters retire. Between the two last-named points, therefore, there is an immense plain, comparable in fertility with the delta of the Camargue in Provence, intersected by rivulets, and dotted with lakes and ponds. Forest trees have sprung up in it, and pine-crowned hillocks rising in a hundred different places show the position of former islands. Crops of the highest quality could be raised on this gigantic and well-watered delta, which contains prodigious quantities of timber deposited by the waters during past ages. I am firmly of opinion that the colonisation and cultivation of this portion of the Athabasca district deserve serious attention, and I have therefore done my best to prepare a map of those two great estuaries as accurately as possible, preserving the local names of the lakes and water-ways. This map is, indeed, the chief result of my labours.

Besides these vast deltas there are other lands, on the left bank of the Slave River, perfectly fit for cultivation; this is indeed proved by the old settlement of the Beaulieu family on the banks of the Salt River; but the settler there would have to struggle against inextricable forests, and an entire want of roads or other communications, without mentioning other serious inconveniences.

But there is in the Athabasca district a belt not overrun by forest, and which has nothing to fear from periodical inundations; where timber only grows sufficiently for the needs of colonists, and is rarely a mechanical obstacle; well covered with undergrowth and grass, capable of cultivation, crossed by a waggon track, watered by streams, stocked with fish-bearing lakes, and offering every facility and advantage for

* On the Peace River district, see also Dawson, in Rep. Geol. Survey Canada, 1879-80, (B) p. 66 *et seq.*

the construction of a railroad. I refer to the zone of natural prairie along the Rocky Mountains, from the mountains of the Upper Saskatchewan to the banks of the Hay River, one of the feeders of the Great Slave Lake. I have been told by very many persons who have travelled over the Great Prairie, by which name this fertile belt is known, that it comprises every condition requisite for settlement, as well as being rich in lumber requisites and minerals of all kinds. Sulphur, bitumen, and coal crop up in many places, with rock-salt, iron, native copper, and even gold (according to report). Against these advantages, must be set the fact that the means of subsistence have become more and more rare, from the rapid diminution and imminent extinction of the animals which supplied the daily food of the Indians, such as the moose, caribou, wapiti, bison of the woods (a distinct species from the musk-ox and prairie bison), beaver, porcupine, &c. The musk-rat alone seems not to have failed as yet, and continues as before to swarm on the lakes, ponds, and smallest streams. I can only regret that I have no personal knowledge of this fertile region.

II.

Lake Athabasca is the smallest of the fresh-water seas which stretch like a chain from the Gulf of St. Lawrence to the Arctic Ocean, east of the Mississippi, the Red River of the North, and the Athabasca-Mackenzie system.

It is 230 miles long by 20 miles broad, and about 600 feet above the level of the Arctic Ocean, according to the observations of General Sir J. H. Lefroy. The position of Fort Chipewyan, the headquarters of the district, is 58° 43′ N. lat., and 111° 18′ 32″ W. long.; that of Fort Fond-du-Lac is 59° 20′ N. lat. and 107° 25′ W. long.

Like a number of other lakes in this region, it is a crystal sheet of water lying in a deep bed, granitic at the north end, and with sandy and muddy deposits at the south. Three of its sides are granite, and a great number of granite islands thickly set with pines dot its surface. But there are no mountains there, and Hearne, the first explorer in 1771, would have been more correct in naming it Lake of the Isles than Lake of the Hills, as the abundance of islands strikes the traveller at the first glance.

I have already explained the Cree meaning of Athabasca. The present inhabitants, the Chipewyan Tinney, call it "Yétapè-t'ué" (Lake Superior), or more habitually "Kkpay-t'èlè-Kkè," or Willow-bed, alluding doubtless to the deltas. This was also the name of an old trading fort at the mouth of the Athabasca river, where willows were the dominant feature of the vegetation, only conifers and aspens being to be seen elsewhere.

The nature of the soil of the lake is therefore identical with that of the great lakes tributary to Hudson's Bay, such as Lakes Wollaston,

Caribou, Beaver, and Bear Lakes, the Lake of the Woods, and Lake Winnipeg, and of those which drain to the Atlantic, such as the Canadian lakes proper.

The fishes of the lake are *Coregonus lucidus* or white fish, salmon trout (which there, as in more northern waters, reaches 35 lbs. and over), Canadian trout, *Catastomus reticulatus*, Maskinongé (*Esox estor*), grey and red sucking-carps, Sandre (*Lucioperca americana*, called Dorcy by the Canadians), the golden-eyed Lakêche, lamprey, Methy (*Lota maculosa*), &c. I only refer here to the larger species, for the very sufficient reason that the smaller ones are entirely unknown.

The north of the lake, which is wholly sterile and rocky, only affords support for caribou, which find a palatable food in various lichens growing there. The animals and plants of the forests and prairies to the south have already been referred to.

It is obviously impossible that very exact cartographic representations should exist of so vast a lake, which has only once or twice been visited by scientific observers, and then only partially, having never been explored as a whole. I have therefore here also to make some alterations in the maps now current. It would, however, be wearisome to enter into a minutely detailed description of all the bays, isles, and capes, for which the map accompanying the present paper must be consulted.

The lake receives eleven watercourses, of which eight (the Peace, Mamawi, Athabasca, Little Fork, William's, Unknown, Beaver, and Other-side rivers) are on its south. The Grease and Carp rivers enter into it from the Barren Grounds; and the Great Fond-du-Lac river flows in on the east. The latter drains into the lake the waters of the Great Black Lake and the Lake of the Isles, a basin dotted with granitic blocks and fed by two streams which are practically a chain of small lakes. The most southerly of these rises at the foot of Beasts Mountain, not far from Wollaston or Great Hatchet Lake; the northern one rises near Lake Caribou, but without having any kind of communication with it.

It was doubtless the proximity of these two great lakes to the most eastern sources of Lake Athabasca that caused Hearne to believe that Lake Wollaston was connected with Hudson's Bay by the Churchill river, and with the Arctic Ocean by Lake Athabasca. Nothing, however, could be more incorrect. The most northern source of Lake Wollaston is the glacial river springing from the elongated granitic water-parting before mentioned. This lake drains into Lake Caribou by the Canoe River, a simple connecting arm, and communicates with the Churchill River by the Deer River. But there is absolutely no communication between the lakes occupying the two slopes of the water-parting.

I have therefore corrected four geographical mistakes about these Canadian lakes, to which various drainages have hitherto been attributed. The first mistake refers to Lake La Ronge, which empties into

the Churchill, and which was also said to open into the Beaver River; but I showed in 1873 that the Beaver receives the La Plonge River, which rises near Lake La Ronge, though not taking the actual waters of the latter lake. The second concerns Lakes Wollaston and Athabasca, as above stated. The third refers to the Great Bear Lake, to which Sir John Richardson attributed three outlets, viz. the Bear Lake River and the Hareskin River, entering the Mackenzie, and the Beghula River, entering the Arctic Ocean. In ascending these three rivers to their respective sources, I proved in 1869–70 that the Bear Lake has only one outlet, viz. the river of the same name; that the Hareskin river flows out of the Wind Lake near Smith Bay in Bear Lake; and that the Anderson (the "Beghula" of Richardson) rises in a little lake at the foot of Mount "Ti-dépay" quite to the north of and some distance from Bear Lake. Lastly, the fourth error is regarding the famous great lake of the Eskimo, to which various openings into the Arctic Ocean were attributed, besides one outlet in the mouths of the Mackenzie and another in the Anderson River. It is now known that this lake (the size of which has been considerably diminished) has but one outlet, the river "Natowdja," a direct tributary of the Arctic Ocean.

I have also, in 1879, made a complete survey of the course of the Slave River from the great lake of the same name to that of Athabasca, in order to complete my former work on the Mackenzie; and it is remarkable that, although I had no map to refer to, and no other instrument than a compass, the result agreed almost exactly with Franklin's route-map of 1820, except as regards some islands which either escaped his observation or have been exposed since his journey, some winter portages that he never crossed, and a few bends in the river which he probably passed at night-time.

Above the rapids formed by the Caribou range, where that range leaves the left bank and turns off towards the east, along the course of the great Des Seins River, or "Thou-bau-dessé," * the Slave River crosses a flat plain covered with inextricable forests, apparently reclaimed by degrees by the sedimentary deposits of its muddy waters. This river has no sandy shores. Its muddy banks are constantly being washed off on one side to be deposited on the other. At times they give way, and the current, precipitated with violence into the forests, opens fresh channels, whilst the old ones, obstructed by the mire and sand brought down, are filled up and transformed into a marshy savanna. The Duck Portage was formed in this way. Entering it from the north (the direction facing the current), the idea is suggested that it is a channel of the river or one of its affluents; but the traveller soon finds himself in

* This river, a southern affluent of the Great Slave Lake, is apparently represented on M. Petitot's map by the "T'al'tsan-Dessé" or Yellow Knives River. The name used in the above text seems to agree with the "Thu-wu-desseh" of the map of Back's "Narrative" (1836), which enters the Slave Lake to the east of the mouth of the Slave River.

an immense dried-up marsh, quite level, and entirely composed of black viscous mud, cracked by desiccation and covered with timber formerly deposited by the waters. Its Chipewyan name, "Tèdh dédh-hèli t'ué" (Floating-wood Lake) points to its origin. There is, however, no trace of any lake; but a chain of wooded and elevated isles shows that this is the ancient bed of the Slave River, which after filling it with muddy deposits has been obstructed in its course by imbedded timber and forced to break a passage to the right by an abrupt eastern elbow. I think this alteration of course has been effected recently. It may perhaps be the outlet which I saw in course of formation in 1862, though I had then no opportunity of accurately fixing its position.

During extraordinary floods, the surplus waters of the Slave River spread over this great marsh and scour the Duck Portage, but at an epoch before the formation of the present bed, when the Duck Portage was the ordinary channel, the overflow passed to the left by another natural channel, now dry. This shows a gradual tendency of the Slave River towards the east in this district. The conditions above referred to as existing at the mouth of the Athabasca, are also shown at the mouth of this river, for the current has so clogged its bed and filled up its estuary as to be compelled to divide and make its way across the sedimentary deposits of its delta, which it cuts up into a great number of mud islands.

The first and oldest of its branches contained large and lofty islands, identical as to soil with the mainland, and wooded like it with white pines, *Populus balsamifera*, aspens, and birches whose venerable trunks show an existence of at least six or eight centuries. If a line be drawn on the right from this point to the mouth of the Des Seins River, and on the left to that of the Oxen River, a triangle or delta will be described wholly occupied by the ancient and recent mouths of the river. The latter, after dividing into three channels, is subdivided into two great median arms, of which the eastern one is called Jean's River, a corruption of the Chipewyan name "Dzan-des-tché," literally Mud-river end, or Muddy mouth. Up to this point, standing trees are found in the delta, but they are no longer coniferous, thus showing that the islands are of later formation. As the channels subdivide, vegetation decreases with them; aspens, poplars, and alders have disappeared, and only small willows, six to eight feet high, are found. Still lower down, nothing is found but reeds, bulrushes, and at last only mare's-tail (*Equisetum*), an exclusively aquatic growth entirely covered during floods.

Such are the products of the last sedimentary formations, which are not yet consolidated. Between them and the lake extends a moving bog, fluctuating with the waters, which cover it for a few inches. Any unfortunate boat running into this mud will infallibly become as firmly imbedded as the innumerable tree-trunks whose roots are horizontally exposed above its surface. Some years hence, these unsolid and un-

fathomable banks will become firm, and, aided by the accumulations and drying effects of frosts in winter, will form new islands more and more encroaching on the Slave Lake.

During the 240 miles of the course of the Slave River, it only receives two affluents, one on each bank, viz. the Dogs and the Salt rivers, the first of which is above and the second below the Rapids interrupting its navigation.

The maps of Lake Athabasca give indeed its southern affluents, but two of these, the Unknown and Beaver rivers, are not represented as being of large dimensions, nor are the lakes from which they spring shown as being within so comparatively short a distance of the lacustrine enlargement of the Churchill known as Lake Lacrosse, that passage from the latter to the tributaries of Lake Athabasca could be made by the head-waters of the Caribou river. I have thought it right to rename these two great rivers and the lakes from which they spring after Messrs. C. P. Gaudet and R. M'Farlane, as a mark of my respect and gratitude.

III.

The first person entitled to honour as the explorer of Lake Athabasca, was Samuel Hearne. He discovered it in 1771, and named it "Lake of the Hills." Seven years afterwards, the North-west Company sent thither a Canadian, Joseph Frobisher, who founded the first trading-post. The Hudson's Bay Company soon followed the example of its rival, so that here, as in many other places, these two commercial bodies found themselves in competition at an early date. Nevertheless, the discoveries of Hearne, of Peter Pond in 1779, and even of Sir Alexander Mackenzie in 1789, however authentic and scientific, were apparently anticipated by the far-reaching tracks of the Courreurs de Bois; for when Pond reached the Great Slave Lake, the half-breed Canadian family of Beaulieu had already settled on the Salt River—one of them, named Jacques, indeed acted as interpreter for this trading officer, just as at a later date his nephew François was Sir John Franklin's hunter and interpreter.

In 1820, and again in 1829, Sir John Franklin, accompanied by Lieutenant Back and Dr. Richardson, visited Athabasca on their way to the Arctic Ocean, when commencing their explorations for the famous North-West passage. The portrait drawn by these travellers of the Chipewyan Tinney (whom they also call, though wrongly, Athabascans) is anything but a flattering one, and shows the recent change for the better in the character and disposition of these Indians. I can myself speak of as great an alteration in the Beaver Indians, who are now as gentle and inoffensive as they were thievish, shifty, and faithless twenty-five years ago. This is the natural effect of the commercial relations and religious habits acquired since that date by those child-like tribes.

The Chipewyans, without being as timid as their northern brethren, who deserved the uncomplimentary epithet of "Slaves" bestowed on them by the first explorers, are now a gentle, peaceful, and honest people, comparatively chaste and religious, though they may perhaps be accused of being a little too morose in disposition and fond of solitude. The Catholic Missionaries first visited them in 1847, and two years later settled among them. In 1866 or 1868, if I remember rightly, a clergyman of the Church of England was domiciled at Fort Chipewyan; and lastly, in 1875, the Montreal Sisters of Charity founded a school with an orphanage and hospital there. This fort has for some years been the seat of an Anglican bishop.

From the time of the historian Charlevoix, a vague acquaintance with Lake Athabasca must have existed in Canada, for he speaks of the Dog-rib Indians and the "Savanois" (now called "Mashkégous" [Maskigos] or swamp-dwellers), the former of whom lived at the north and north-east of the lake, while the hunting-grounds of the latter were to the east and south-east.

At this date, the Ayis-iyiniwok or Iyiniwok (Men), called by Duponceau "Killistini," by the Ojibbeways "Kinistinuwok," and by the French "Cristineaux" (also called "Klistinos" and "Knistineaux"), from which have finally been derived the names Cris, Crees, Kree, and Krî, lived on the banks of the Beaver-Churchill river, which they called Great Water (Missi-Nipi), as well as on the shores of Cross Isle Lake, Moor-hen Lake, Cold Lake, &c. In short, they occupied the country between the Savanois Indians on the east and the Grandes-pagnes (also called Prairie-Crees), on the west. The Chipewyans at that time lived along the course of the Peace River, after crossing the Rocky Mountains, not having yet ventured down into the country now occupied by them between the Great Slave Lake and Frog Portage on the English River. It was in fact their primitive home in the Rocky Mountains that originated the Canadian name "Montagnais" or Highlanders for these Tinney, who now live in a flat country.

Lake Athabasca, the Slave River, and the shores of the Great Slave Lake were the exclusive territory of another tribe of Tinney, to whom the epithet of Slaves was given, from their natural timidity and cowardice. They themselves recognised two divisions, people living among the hares (or northern Tinney), and among the rabbits (meaning the Chipewyans). The latter name is applied by the Crees to the entire Tinney nation, and means "Tailed men," i.e. men clothed in tailed skins. This arose from the fact that all the Tinney, like the modern Dindjiés of Alaska, used to wear a fringed robe of moose or reindeer skin, ending in a long point in front and behind.

The Indians using the Algonquin tongue, such as the Crees, Savanois, Grands-pagnes, and Ojibbeways, carried on a pitiless war against the Athabascan Tinney or Slaves, who from natural timidity gave up their

territory to their enemies, and fell back on the Great Slave Lake, pursued by the Crees, who made a great slaughter among them. Various islands and archipelagos retain the name and the memory of these dreaded Ennas (strangers, enemies), including Dead Men's Isle, which keeps alive to this day the recollection of the defeat of the Katchô-Ottiné, subsequently called Slaves. From that time, this portion of the Tinney family never ventured south, but remained in the cold lands and swampy forests of the north, where they became split up and settled under the names of Dog-ribs, Hareskins, Highlanders, Slaves, &c. Their different tribal dialects vary but slightly *inter se*, differing much more widely from the Chipewyan.

The Killistino or Crees, established on Lake Athabasca and its tributaries and drainers, found themselves exposed to the attacks of the Chipewyan Tinney arriving from the west by the Peace River (called Amisko-Sipi or Beaver River by the Crees), thus proving that the Tinney family, or at least its northern tribes, are of later origin on the American continent than the Killini or Hillini Lléni. But, being as brave as, if not braver than, the invaders, they offered such a resistance that prisoners and slaves were made on both sides. Meanwhile the English appeared in Hudson's Bay at the mouth of the Missi-Nipi (called English River from them), and founded a factory there named Churchill, after the then Prime Minister of England. This became the medium of commerce between the coast Eskimo, the Savanois, and the Crees of the interior.

Before the Hudson's Bay Company sent Hearne to explore the interior, a Chipewyan woman named Tha-narelther (Falling Sable), was carried off by a Savanois war-party, and taken in captivity to the shore-region of Hudson's Bay. She saw with astonishment in the tents of her captors domestic utensils and arms entirely new to her, and as she at first believed them to be of native manufacture, she admired the intellectual superiority of the Killini, and determined to remain with a people so superior to herself in intelligence and cleverness. But she did not live among them long before detecting from their ways and ceaseless wanderings that they obtained these things from strangers, in exchange for peltry and provisions. This traffic puzzled the captive, but as she imagined that the original possessors of the riches bestowed upon the Savanois must be their relations or allies, she never thought of taking refuge with them and begging their protection. Only after some years of harsh captivity, did she discover that the "Agayasieu" (the Cree name for the English), who supplied the Crees and Savanois, belonged to an entirely strange race, good-natured and generous, friendly with all the aborigines, and coming from the far east to trade with them. Her mind was then soon made up. She succeeded in reaching Fort Churchill alone, and as she had learned enough of the Algonquin dialect to make herself understood by the interpreters of the fort, she was enabled to let the Hudson's Bay Company's officers know that she belonged to the great

nation of "Men" (Tinney), living far off in the west, and professing honesty and fair-behaviour like the English. She expressed her determination of returning to her own people, and begged for assistance on the way home, promising to establish friendly relations between her countrymen and the officers of the company, who, glad of the opportunity of extending the sphere of their commercial transactions, gave her a sledge and dogs, with various presents, and a safe conduct through the land of the Killini. Attracted by these presents, the Chipewyans at once undertook the long voyage from the Peace River to the mouth of the Churchill, calling the fort "Thé-yé" (stone house), and its inhabitants "Thé-yé Ottiné" (men of the stone house), a name by which the English are still known among the Tinney.

These relations continued to the time when Joseph Frobisher established Fort Chipewyan, on the shores of Lake Athabasca, in 1778, for the North-west Company, at which date there were as many as 1200 Redskins settled on the lake. But the white man brought with him the horrible disease of small-pox, till then unknown to the Americans, which made great ravages among the Tinney, and more than decimated the Crees, driven to the southern part of the lake by the warlike attitude of the Chipewyans. Influenza, an epidemic catarrhal affection attacking the tribes at regular intervals of about seven years, completed the work of the small-pox. Reduced to a very small number, the Crees ceased all hostile action against the Chipewyans, who had become their superiors both in numbers and strength; so that the possession of the lake, and indeed of the territory of Athabasca, remained with the Tinney, who permitted a few Crees and Savanois to remain among them.

From Athabasca, the Chipewyans spread north by degrees towards the shores of the Great Slave Lake, and east and north-east towards Hudson's Bay, where, having met with vast herds of wild reindeer, they settled on the Barren Grounds, living from that time in common under the names of Yellow-knives ("T'altsan Ottiné"), and Caribou-eaters ("Ethen eldéli"). Such of these as remained attached to the Churchill traders, took the name of the latter and are still known to their western fellow-tribesmen as "Thé-yé Ottiné"; finally, many of them even ventured south to Lake La Biche, Cold Lake, Lake La Ronge, Cross Island, Heart Island, &c., where they bear the name of "Thi-lan Ottiné" (Men of the end of the head).

When leaving the fertile plain watered by the Peace River and its affluents, the Chipewyan Tinney were hard pressed by a tribe still more warlike than themselves, namely the Sécanais or "Thé-kké Ottiné" (Men who live on the mountains), who in their turn had come from the western slope of the Rockies, where they left tribes identical with themselves as to language and customs.

As to the Beaver Tinney, they crossed the mountains to the south and reached the plains of the Saskatchewan, where still lives a remnant

of this people, the Sarcis (in Cree, "Sarséwi") whose Black-foot name means bad (from "Sa arsey," not good).

Hearne permitted the association of some Chipewyans on his expedition to the Copper-mine River, a tributary of the Arctic Ocean, with a result that is well known, as is also the massacre committed by his followers among the Eskimo.

The Hudson's Bay Company was not long in founding a trading post on Lake Athabasca, establishing one under the name of Wedderburne on an islet near Fort Chipewyan. This remained till 1821, when the rival companies united their interests and put an end to their regrettable hostilities.

Commerce and religion have materially civilised the manners and character of the Cree, Chipewyan, and Beaver Indians inhabiting the Athabasca district. They are at present quiet, peaceable, inoffensive, and friendly to the white man, but very much diminished in numbers, the failure of animal life, and the extraordinary decrease for many years in the waters of the rivers and lakes, which has destroyed fish-life to an immense extent and driven away wild-fowl, having caused such a famine that many died of hunger and misery between 1879 and 1881. There were 900 Chipewyans and 300 Crees at Fort Chipewyan in 1862, but in 1879 I could only find 537 Chipewyans and 86 Crees, even including those living on the river Athabasca. Now there is but one single family of Crees at the lake, and the remnants of the tribe have gone away to join their fellows of the Peace River.

The same fate has befallen the Chipewyans. In their total of 500 must be reckoned those of Fort Smith, at the foot of the rapids of the Slave River, as well as those of the Salt River, and many families of the Great Slave Lake and Ox River.

In short, the Athabasca district, comprising the Peace River and parts of both the Lesser and Great Slave Lakes, now contains no more than 2268 souls, including 150 half-castes and 57 white men of various origin—English, Scotch, Irish, and French-Canadians.

The following are the exact statistics in 1879, for which I am indebted to Mr. R. M'Farlane, the chief of the district:—

Forts.	Tinney.	Crees.	Half-castes.	Whites.
Chipewyan, Smith, and Small Red River, together	537	86	50	28
Fond-du-Lac	318	..	15	2
Resolution (Slave Lake)	300	..	25	15
Vermilion (Peace River)	234	6	15	2
MacMurray (Clear-water River)	31	22	10	4
Dunvegan (Peace River) and Battle, together	195	137	20	6
St. John or D'Epinette (Peace River) and Slave Lake, together	195	..	15	
	1810	251	150	57

Grand total of the Athabasca district, 2268.

The following statistics of the whole Athabasca and Mackenzie Red-skin population (including women and children), were collected with great care by myself in various localities which I have visited or stayed in at different times. I have before me synoptical tables by tribes and families, including even the names of the individuals.

	Great Slave Lake.		
Fort Resolution, 1863–64	Chipewyans	245	
	Yellow Knives	332	
			577
Fort Rae, 1864	Dog-ribs		788
	Mackenzie.		
Providence, 1871	Slaves or Etcha-ottiné		300
Black Lake River, 1878	Etcha-ottiné		115
Hay River, 1874	„ „		100
Fort Simpson, 1873	„ „		300
Forts Norman and Franklin (Bear Lake), 1869, together	Slaves or Etcha-ottiné	97	
	Dog-ribs	47	
	Mountain Indians	43	
	Hareskins	85	
			272
Fort Good Hope, 1867	Hareskins		422
Fort Macpherson (Peel River), 1866, including La Pierre's House	Dindjié or Loucheux, Quarrellers, Kutchin		290
	Eskimo of the Anderson	250	
	„ „ Mackenzie	300	
			550
Forts Liard and Nelson, Liard River	(Not collected by myself) Slaves		500
	Population of the Mackenzie		4214
	Athabasca.		
Forts Chipewyan and Smith, 1879	Chipewyans	537	
	Crees	86	
			623
Fond-du-Lac, 1879	Caribou-eaters		318
Vermilion, Peace River, 1879	Beavers	234	
	Crees	6	
			240
Fort MacMurray, Athabasca River, 1879	Chipewyans	31	
	Crees	22	
			53
Fort Dunvegan, Peace River, 1879	Beavers and Sécanais	195	
	Crees	137	
			332
Fort St. John, Peace River, 1879, Lesser Slave Lake	Sécanais		195
	Population of the Athabasca		1761
	Maximum total *		5975

* These figures may be compared with similar but less detailed statistics collected by Captain (now Sir Henry) Lefroy in 1844, and published in the Proceedings of the Canadian Institute, 1853. They were also based on the books of the Hudson's Bay Company's trading posts and the personal knowledge of its officers. The enumeration of the Tinney under various subdivisions comes to 1592 men, estimated to represent 7575 souls. To these were added, at Fort Chipewyan, Lesser Slave Lake, and Isle à la Crosse, 209 families of Crees, estimated at 1081 souls. The Indians have apparently, therefore, decreased in numbers since 1844.

For commercial statistics, I must refer to the Hudson's Bay Company, having made it a rule in the performance of my duties as a missionary never to interfere in the least with business matters. It is of course well known that the main produce of the region consists of fur and beaver skins.

I may conclude this paper with the following table of temperatures, taken by myself at Lake Athabasca in March, April, and May 1879, from which I found that the spring there was at least quite a month in advance of that of the 66th north parallel.

Date.	Weather.	Temperatures.		Observations.
		7 A.M.	Noon.	
1879		° Fahr.	° Fahr.	
March 1	Fine	1·40		
„ 2	Cloudy	1·40		
„ 3	Fine	— 9·40		
„ 4	„	— 7·60		
„ 5	„	— 16·60		
„ 6	„	— 18·40		
„ 7	Snow	5	14	
„ 8	Fine	— 9·40		
„ 9	„	— 7·60		
„ 10	Cloudy	— 4		
„ 11	Fine	— 23·80		
„ 12	„	— 25·60		
„ 13	„	— 4		
„ 14	„	— 18·40		
„ 15	Thawing in sun	— 22		
„ 16	„	— 9·40	14	
„ 17	„	— 5·80		
„ 18	Fine	— 11·20		
„ 19	„	— 13		
„ 20	Thawing	— 4	21·20	
„ 21	Snow	6·80	24·80	
„ 22	Fine	— 4		
„ 23	Cloudy	6·80		
„ 24	Fine	17·60	26·60	
„ 25	„	14		
„ 26	Windy	10·40		
„ 27	„	8·60		
„ 28	Fine	17·60		
„ 29	„	5		
„ 30	„	10·40		
„ 31	„	14		
April 13*	Fine	50	..	Water running in gutters.
„ 14	„	55·40		
„ 15	„	59		
„ 16	Snow	53·60	..	Pools of water on the lake-ice.
„ 17	Fine	35·60		
„ 18	Rainy	46·40	..	Ice dry.
„ 19	„	35·60		
„ 20	„	46·40	..	Wild duck seen.
„ 21	Fine	35·60	53·60	

* N.B.—No record kept till the 13th. A considerable rise in temperature during the interval.

Date.	Weather.	Temperatures.		Observations.
		7 A.M.	Noon.	
1879		° Fahr.	° Fahr.	
April 22	Fine and windy	59	..	Frogs croaking.
„ 23	„ „	42·80	..	Mosquitoes.
„ 24	Fine	32·90	46·40	Starlings seen.
„ 25	„	35·60	..	Thrushes; flies.
„ 26	„	37·40	55·40	Pelican; birch-syrup making begins; edges of the lake quite free from ice.
„ 27	Rainy	37·40	..	Budding.
„ 28	„	32	46·40	Butterflies; swans; beetles; *Anemone pulsatilla* flowers; ploughing.
„ 29	Fine	32	50	*Tussilago farfara* flowers.
„ 30	„	35·60	..	Breaking-up of the lake-ice; willows bud.
May 1	Fine	50	60·80	Sowing.
„ 2	„	46·40	60·80	White and grey geese seen.
„ 3	Rainy	46·40	..	Water very low; lake dry; ground green.
„ 4	Cloudy	50		
„ 5	Fine	46·40	..	Penny-royal; yellow-hammers [? *Sylvicola æstiva*]; gooseberry bushes showing leaves.
„ 6	„	50		
„ 7	„	46·40		
„ 8	Windy	41	..	Ice entirely gone.
„ 9	Fine	46·40	..	Cranes; white fish plentiful, but dying from want of water, and killed with sticks in the dry channels.
„ 10	Cold	41		
„ 11	Snow	32		
„ 12	Fine	33·80		
„ 13	„	35·60		
„ 14	„	46·40		
„ 15	„	42·80		
„ 16	„	32	37·40	
„ 17	„	59		
„ 18	„	42·80		
„ 19	Cloudy	39·20		
„ 20	Fine	46·40		
„ 21	„	50		
„ 22	„	59		
„ 23	Cold winds	42·80		

GEOGRAPHICAL NOTES.

Exploration of New Guinea.—The Council of the British Association, at the recent Southport meeting, adopted a recommendation from the Geographical Section, having for its object the exploration of the interior of New Guinea. A committee was formed (with power to add to their number), for the purpose of advising the Council of the Association on the mode of proceeding, its members being Lord Aberdare, Lord Alfred Churchill, Admiral Sir Erasmus Ommanney, Colonel Godwin-Austen, Professor H. N. Moseley, Mr. Francis Galton, and Mr. W. T. Blanford; with Mr. H. W. Bates as Secretary. The Council is empowered to make representations, if they see fit, to the Imperial and to any of the Colonial Governments, Public Institutions, or Scientific Societies, urging the desirability of despatching a scientific expedition to New Guinea, and will offer a grant of 100*l.* towards the scientific outfit.

Colonial Expeditions to New Guinea.—The ministry of New South Wales, in response to urgent representations on the part of the newly-organised Geographical Society of the Colony, has consented to place the amount of 1000*l.* on the estimates, towards the expenses of a scientific expedition to New Guinea under the auspices of the Society, on condition that the Governments of the other Colonies—Queensland, Victoria, and South Australia—contribute a grant of similar amount. The New South Wales Geographical Society propose to make these grants the nucleus of a subscription fund to be opened in all the Colonies. The deputation to the Minister explained that the Society had in view an exploration on a basis similar to that adopted by the Royal Geographical Society of London in their expeditions to Central Africa, and that when the subscription fund was fairly started they intended to communicate with the London Society and with the Imperial Government.—Meantime an expedition despatched in August last by the proprietors of the Melbourne *Argus*, appears to have had little success. At least we learn by a telegram in the daily papers from Cooktown, Queensland, dated October 17th, that the party had returned to that place, some of its members having been attacked by fever, to which one of them, Professor Denton, had succumbed.—We hear of other private expeditions being in preparation.

Mr. H. O. Forbes, the naturalist traveller in the Eastern Archipelago,* has just returned to England after five years' wanderings. Leaving London in October 1878, he first visited the Keeling Atoll in the South Indian Ocean, where he made a series of observations on the amount of change observable in the reef since it was visited by Darwin in the *Beagle* in 1836, an account of which he published in our 'Proceedings'

* See *ante*, p. 408.

for December 1879. On returning from the Keelings he proceeded to the western and southern districts of Java, where, besides making extensive zoological and botanical collections, he instituted a series of observations and experiments on the fertilisation of orchids, the unexpected results of which will shortly be published, as well as on the curious honeycombed and ant-infested *Myrmecodia* and *Hydnophytum*, through which he arrived at almost the same conclusions as Dr. Treub, the Director of the Botanic Gardens, Buitenzorg, who has, in a recent number of the 'Annales' of that garden, given us a complete account of their development. Leaving Java in 1880, Mr. Forbes proceeded to Sumatra, where, entering at Telok-betong on the Sunda Strait, he traversed the greater part of the country to the south of the Djambi Sultanate, into which, however, he could not penetrate owing to the hostility of the natives, a circumstance which necessitated his return to the east coast by way of the Moesi River. This journey occupied about eighteen months, during which the higher peaks of the Barisan range were ascended, hypsometrical observations taken, and very extensive botanical collections made, especially of the forest trees, of which specimens are rarely obtained by collectors. Among the most interesting regions visited were the Blalauw plateau, an elevated district near the Besagi volcano, where several rare birds were obtained, and the Passoemah lands round the high volcano of the Dempo, inhabited by a pagan race, whose customs were found to be widely different from those of the surrounding peoples, and where Mr. Forbes discovered two large sculptured figures, hideously visaged, closely resembling two already known, but quite different from the broken blocks, nearly all of them quite defaced, which are found at different places in the Palembang Residency, and about none of which does there exist any tradition among the people. He visited also the Upper Moesi region inhabited by the forest-living Koeboes supposed to be the remnants of the indigenes of the island, and of whom he brought back two crania and one skeleton which show divergences from that of the true Malay race. Leaving Sumatra in 1882, Mr. Forbes proceeded, along with his wife, the first white lady to visit these hostile shores, to the till then unexplored island of Timor-laut (touching on the way at Amboina, New Guinea, the Aru and the Ké islands, making small collections in each), where, assisted by a grant through the liberality of the British Association, he made zoological and ethnographical collections rich in novelties which have been described recently by Mr. P. L. Sclater and others in the Proceedings of the Zoological Society, and by Mr. Forbes himself in a paper before the Anthropological Institute during the present year. On his return to Amboina from the Tenimber group he paid a visit to the eastern portion of the large island of Timor, which, by exceptional privileges granted by the Portuguese Governor, he was able to traverse. Mr. Forbes speaks in the very highest terms of the generous and abundant aid given him by

the Dutch Government, and of the kindness and courtesy of the officials, among whom he specially mentions Dr. M. Treub, the Director of the Botanic Gardens. He hopes to start again in the early part of next year to resume his investigations in Timor-laut, and thence to prepare for the exploration of the interior of New Guinea.

Dr. Fischer.—Further details regarding Dr. Fischer's expedition into the Masai country have been published by the Hamburg Geographical Society, under whose auspices the traveller has carried out his undertaking. The plan of the expedition was to start from Pangani and travel through the region hitherto untrodden by Europeans west of Kilimanjaro, towards Lake Bahringo. He had reached a point only six days' march from this semi-mythical inland sea, when his porters refused to go further. A force of 3000 Masai warriors blocked the way. These turbulent warriors were without a common leader, for all the chiefs who possessed any influence over them, or could have held them back from deeds of violence, were absent. To have negociated a right of road through this disorderly band would have cost Dr. Fischer nearly the whole of his remaining stock of goods, and to outflank them by a forced march through the primitive forest, his porters decidedly refused to attempt. He had, consequently, to retrace his steps, reaching Zanzibar in safety with his large scientific collections on the 28th of August. Starting in December 1882 from Pangani, his route was in a northerly direction through Paré, Arusha and Sigirari; on his return journey he took a more westerly direction round Lake Naivash and the Natron Lake to the volcano Doenyo Ngai, and thence through Ngaruka to Mount Meru. Near Lake Naivash he discovered a large hot spring; he met with no active volcano, though the whole district is of volcanic nature. Dr. Fischer is bringing home a remarkably rich ethnological collection, besides an ornithological collection of 260 species represented by 400 specimens, a large proportion of which are new to science, and numerous dried plants, minerals, and specimens of the larger mammalia and smaller animals in spirits. Of the 120 native porters he took with him, 18 deserted, not an unusually large proportion. Fatal encounters like that in which Dr. Fischer's caravan was involved at Sigirari on the outward journey, causing the retreat of Thomson's expedition, are of common occurrence in the Masai country, and cause no hindrance to other caravans following after. Fischer's porters, who killed several of the Masai, were driven to it in self-defence, and after the usual blood-money had been agreed on and paid, the opposing parties became friends again. Dr. Fischer is expected soon in Hamburg, and his expedition being the first sent out by the Hamburg Geographical Society, an enthusiastic reception awaits him.

Discoveries along the Watershed of Lakes Nyassa and Bangweolo and the River Zambesi.—Mr. James Stevenson has communicated to

us the purport of a recent letter from Mr. James Stewart, C.E., which gives an account of important geographical discoveries he has made in the upland region between Lakes Nyassa and Tanganyika. On an excursion from his road-station of Maliwanda,* westward to Mount Mapurumuka, he passed in two days' march the affluents of the Songwé, flowing to Lake Nyassa, the Loangwa flowing to the Zambesi, and the Chambezi flowing to Lake Bangweolo. The source-streams of the Chambezi were found to be at a height of 934 feet above Bangweolo, and where they unite form a considerable river, unfortunately not navigable thence to the lake. But as further along the road to Tanganyika streams are marked as flowing to the Chambezi on a level only 500 and 600 feet above Bangweolo, he inferred that the river would be found navigable from a distance of 100 miles across the plateau, the descent from the mountains being more rapid in the first part.

A British Consulate on Lake Nyassa.—Captain C. E. Foot, R.N., has been appointed British Consul for the Lake District of South Central Africa, and left England to enter on the duties of his post on the 30th ult. He is accredited, as Livingstone formerly was, to the native chiefs of the region, and will endeavour to enter into friendly negotiations with them with a view to the suppression of the slave trade and the promotion of civilisation and commerce. Captain Foot's mission is to some extent a roving one, and his well-known interest in African exploration justifies us in anticipating valuable additions to our geographical knowledge from his appointment.

M. Flegel's Projected Expedition from the Congo to the Niger.—Admiral von Schleinitz, the President of the German African Society, has received a letter from M. Flegel, dated from Abudja, near Onicha on the Niger, August 13th, 1883. The traveller gives the welcome news that the reports of his ill-health were much exaggerated. He was already preparing for a new trip into the interior, when he received the letter announcing the handsome grant (40,000 marks) offered to him by the German African Society to enable him to carry out his important journey from the Niger to the Congo viâ Adamawa. He has lost no time in completing his equipment, and was preparing to start for Adamawa immediately.

Lieutenant Wissman, the companion of Dr. Pogge in his successful journey from the West Coast to Nyangwe in 1881–2, a journey which he afterwards continued alone across the continent to Zanzibar, has been engaged by the International African Association to command a new expedition in the basin of the Congo. The means placed at his disposal will permit him to organise the expedition on a grand scale.

Exploration of Ovampo-Land.—Dr. C. Höpfner, a young German geologist, who started in July 1882 from Mossamedes to explore the

* Vide map, 'Proceedings R. G. S.' 1880, p. 464.

mineral capabilities of Ovampo-land and Damara-land, has returned to Germany well satisfied with the results of his reconnaissance. He gave a short account of his travels to the Berlin Geographical Society at their last meeting (October 6th, 1883), confining himself to his personal adventures. His route was from Mossamedes to Humpata (the new settlement established in Portuguese territory by the migrating Boers), and thence, crossing the Cunene, through the districts of the Ovampo to the country of the Damaras, whose first village he reached in January 1883, finally reaching the coast at Walfisch Bay. Dr. Höpfner is anxious to be back as soon as possible to the field of his explorations, in order to continue and complete his work, which he was obliged to suspend for want of means.

The 'Dijmphna' Expedition.—Herr Augustin Gamél of Copenhagen has received telegrams from Lieutenant Hovgaard, dated the 11th of October, saying that the *Dijmphna* arrived on that day at Vardö. She got out of the ice on the 2nd of August, and on the same day the screw-shaft broke, and the ship was again beset. She was finally released on the 13th of September; but the cylinder-rod, which had been fixed as a temporary screw-shaft, broke down after two hours' use, though the screw was left hanging. Being thus disabled, Lieutenant Hovgaard confined his efforts to saving the ship. Fortunately the ice opened towards the south-west, and by dint of sailing, warping, and towing, the north-east point of Waigatz Island was reached, though with great difficulty. The ice was here very close, and the ship was driven with it through the Kara Strait by a gale on the 21st. She got clear of the ice on the 25th, in lat. 71° 17′ N., long. 55° 52′ E., and then encountered gales, alternating with calms, until the 6th of October. Lieutenant Hovgaard states that while drifting during the winter he had an excellent opportunity to study the ice movements in the Kara Sea, which are far from being so bad as they seem. He was collecting information in Finmarken from the walrus-hunters which might possibly clear up many doubtful points. He has obtained a complete series of observations—meteorological, hydrographic, and aurora—as well as observations on the formation and nature of the ice. The collections contain over 500 different species of marine fauna, and 250 botanical species. He also brings all the instruments and collections of the Dutch expedition. He adds that, if he may have the ship again, he will make another attempt, and if nothing unforeseen occurs, as it did this year, there is no reason to fear that the expedition will be unsuccessful. He hoped to be able to repair damages and leave Vardö by the 20th of October, and a full report of his voyage would reach Copenhagen about the 8th of November. All well on board.

The Sixth Voyage of the Willem Barents.—The sixth voyage of the *Willem Barents*, though unsuccessful as regards its main object, which was to obtain news of the *Dijmphna* and *Varna*, has at least furnished a very accurate

picture of the state of the ice during the past season in the vicinity of the straits leading to the Kara Sea. The *Willem Barents* left Vardö for Gooseland and the Waigatz, after a very good passage to the north of Norway, on the 31st of last May, and having reconnoitred the edge of the ice, proceeded to Archangel to see if any news had been received from the coast of Yalmal, where it was possible that retreating parties might have landed. As nothing had been heard of the missing ships or their crews at Archangel, she sailed again for the Kara Sea on the 24th of June, after exchanging telegrams with the Dutch Arctic Committee, to search the east coast of Waigatz and Novaya Zemlya for boats or men. Kolguiev Island was reached for the second time on the 4th of July, but owing to bad weather and calms little progress was made till the 9th, when the *Willem Barents* was about fifty miles south of Kostin Shar, with no ice in sight. While she was working to the eastward a steamer hove in sight which proved to be the *Nordenskiöld*, commanded by Captain Johannesen, which had lost sight of her companions * in a fog. For the next day or two the *Willem Barents* was hampered by loose sailing ice, and on the 15th of July again sighted the *Nordenskiöld*, which soon after came alongside and was boarded by some of the Dutch officers. During the night they were joined by the Norwegian schooner *Haabet* which was chartered by Mr. Sibiriakoff to take building materials to Jugor Strait, and also by the small steamer *Obi*. Captain Johannesen said that he had been as far as Waigatz, and had met a walrus sloop whose people had told him that both Jugor Strait and the Kara Gate were completely blocked by ice. He intended to take the *Haabet* in tow and leave her in some harbour on the coast of Novaya Zemlya, until he could take her into Jugor Strait, when he would proceed with the *Obi* to Yenisei. He said that a south or south-west wind would clear the ice away in six or eight days and free the straits, but with northerly winds nothing could be done. Lieutenant Dalen, the commander of the *Willem Barents*, therefore decided to run up to Kostin Shar, water ship, and then return to the southern straits. At this time the whole of the Petchora Sea was more or less full of loose ice, except down by the Russian coast. During the night of the 15th July all three of M. Sibiriakoff's ships went away to the north in company, leaving the *Willem Barents* anchored to an ice floe, and she did not again fall in with them. The *Willem Barents* got out of the ice on the 20th of July, and on the following day, after a fine run, sighted Meshdusharski Island, which forms the Kostin Shar. On the 21st a steamer was seen going eastward, which was supposed to be the *Louise*,† but she was too far off to be communicated with. There was an awkward swell off the south entrance to Kostin Shar, and as the weather was thick, and a good deal of ice came down through the strait, the *Willem Barents* got an unpleasant bumping, so Lieutenant Dalen decided to go to Karmakuli for water. The wind however was dead foul, and after a hard beat to windward the *Willem Barents* anchored in a long narrow bay on the north-west side of Meshdusharski Island, where water could be obtained by catching the drippings from the snow-foot that still clung to the shore. There were only a few small floes about, and these soon drifted away. The land was exceedingly bleak and desolate, and seemed to be composed of mud and small stones. There were many lagoons, and many fresh-water lakes inland, but no streams from which to fill the ships' tanks, and as catching the drippings from the snow-foot was a tedious process, the *Willem Barents* did not leave her anchorage until the 28th of July. Several reindeer were seen at this place, and the sportsmen of the party bagged an owl and three white swans besides fifty or sixty looms. There were geese and eider about, but the few eggs found were bad. After leaving the bay a south-easterly course was steered, and Waigatz Island was sighted on the 31st of July. For the next three

* See *ante*, pp. 406, 555. † See *ante*, p. 406.

weeks the *Willem Barents* had a continual fight with the ice, and was at last fairly driven off the field. The wind was north-easterly the whole time, and the ice kept driving before it through the Kara Gate, while large masses were packed against the west side of the island, being probably kept there by a current, as the wind would otherwise have driven them to the south-west. Sometimes the *Willem Barents* was in the middle of the Kara Gate, which was found to be an awkward place with numerous rocks and reefs; sometimes she was down by Jugor Strait, and sometimes under the coast of Novaya Zemlya. The weather was generally dull and misty, but the water was fortunately smooth. On the 4th of August the walrus sloop *Kongsberg* was seen off Waigatz Island, and her commander, Captain Limika, said he had been two months from Hammerfest, and had sailed through loose ice into the Kara Sea, where he had found the pack fast and heavy, forming a bay extending from the south-east part of Novaya Zemlya round to the east coast of Waigatz Island. He had been driven by the ice into shallow water in the Kara Gate, and very nearly crushed, but the floe passed under the ship and he finally got free. Some days later the sloops *Freya* and *Lydiana* were spoken, and they confirmed Captain Limika's account of the state of the ice in the Kara Sea. The *Freya* had also had a bad nip in the Kara Gate, and both were waiting for a southerly wind to clear away the ice. On the 16th of August, a north-easterly gale drove the *Willem Barents* out of the ice to the westward, but she gallantly returned once more to the charge, only to find that the ice in the straits was even closer and heavier than before the gale. It was clear, therefore, that no passage could be effected that way, at all events by a sailing vessel. There was now a great deal of ice in the Petchora Sea, and the nights were beginning to get dark, so that it was not easy to keep clear of it; and as a change of wind to the westward would have involved the risk of being beset, it was decided to give up the southern straits and try Matoschkin Shar. When proceeding to the westward, it was found that the ice had driven down very fast during the last few days, and it was necessary to go a long way south to get round it. The *Willem Barents* left the neighbourhood of Waigatz on the 21st of August, and entered Matoschkin Shar on the 26th. She lost the wind off Eira Bay, where the boats of the *Eira* landed last year, and had to anchor, but soon afterwards proceeded to Altglaubigen Bay, where a party landed. There were two Russian boats here with oars in them, and a heap of firewood alongside, but there was nothing to indicate to whom they belonged, or why they had been left. At Tscherikina three fine reindeer were shot, and as all were in splendid condition they furnished a welcome supply of fresh meat. On the 28th of August, the *Willem Barents* proceeded up the strait, passing a good deal of loose ice, and anchored under a high hill a little to the westward of Gubin Bay, on the south shore. Mr. Grant climbed up a hill to see how the ice lay to the eastward, and reported that there seemed to be a good deal of pack ice in the Kara Sea, but he thought he could see water beyond with streams in it. The weather was bright and beautiful. During the night, young ice formed in the bay, but the next day was bright and hot, with a blue sky and no wind, so a boat was sent eastward to reconnoitre. The party landed on Cross Cape and climbed a hill some 1000 feet high, whence they had a good view of the Kara Sea. There seemed to be pack ice everywhere, far out to sea, with here and there a pool of water; but in the far distance there appeared to be some water with streams of ice beyond it. The horizon was, however, a little hazy, and it was not possible to form a decided opinion. After leaving a record in a cairn, the explorers went on to Wood Cape where they found the hut in which Lieutenant Rosmyssloff wintered in 1768–9, and here they built a large cairn and left a record stating that if the ice permitted they intended to remain in this part of the strait for a day or two, and would leave a full account of their movements at

the watering place. This was done in view of the possibility of boats from the *Varna* or *Dijmphna* passing that way. After that they returned to the ship, passing through a good deal of young ice, which was so tough in places that the men had some trouble in digging their oars into it. A north-easterly wind sprang up soon after their return, which rendered the anchorage unsafe, so the anchor was weighed, and the ship crackled through the young ice to the westward before a fresh breeze, anchoring off the Sumilicha river on the 30th of August. The weather now changed for the worse, and on September 3rd there was snow on the hills. The next day a large cairn was built, and a depôt of provisions was buried near it. Records were also left, and having thus left no stone unturned to fulfil the main object of the voyage, the *Willem Barents* sailed out of the strait on the 5th of September and shaped course for Hammerfest. Her difficulties were not yet over, however, for the wind shifted to the south-west almost as soon as she left Matoschkin Shar, and though this was exactly what the gallant explorers had been wishing for for six weeks, it was now too late to be of use, and only added to their disappointment. At 5 P.M. on the 14th of September, when passing Ingö lighthouse on the north coast of Norway, the jibboom was carried away in a heavy squall, and being thus deprived of her head sails the ship was in great danger of being driven ashore. The wind blew in furious squalls, churning up the surface of the water like smoke; it was fast growing dark, and it was impossible to fetch the anchorage in Havö Sund. Fortunately, however, there was another about six miles distant in Oestvaag, a small bay on the south-east side of Maasö, and this with great difficulty was reached at 8 P.M. She was detained at Oestvaag for three days by gales and calms, and then proceeded to Hammerfest, arriving safely at Amsterdam, after a good passage, on the 6th of October.

Obituary.

Mr. Egerton Vernon Harcourt, whose death took place on the 19th of October, had been a Fellow of this Society for forty-three years. He was the youngest son of the Archbishop of York, and brother of the Rev. William Vernon Harcourt, one of the founders of the British Association. His mother was Lady Anne Leveson Gower, sister of the first Duke of Sutherland. Born in 1803, he distinguished himself at Westminster, where he was Captain of the School, and he obtained first-class honours, both classical and mathematical, at Oxford, in 1824. He was called to the Bar at the Inner Temple in 1830, and was for many years Registrar of the diocese of York. Mr. Egerton Harcourt became a Fellow of this Society in 1840, and he served on the Council of the Hakluyt Society for several years. He was also a Member of the Committee of the Geographical Section of the British Association on several occasions, the last being at Sheffield in 1879, and York in 1880.

For nearly a quarter of a century Mr. Egerton Harcourt has resided at Whitwell Hall, near York, where his life was one of active usefulness and benevolence. His work as Chairman of the Castle Howard Reformatory and as a promoter of other useful institutions was untiring up to the last year of his life, and his place will not easily be filled. His munificent donations to the diocese of York are necessarily well known; but his acts of kindness and thoughtful benevolence were habitually as unostentatious as they were frequent. He was married to Laura, youngest daughter of Sir William Mordaunt Milner, Bart., of Nunappleton, in Yorkshire, who survives him.

CORRESPONDENCE.

The Upper Salwen, or Lu-tze-kiang River.

October 13*th*, 1883.

Sir,—I observe that Colonel Prejevalsky in his last work (see the German translation of a portion thereof in Petermann's 'Mittheilungen,' Parts ix. and x.) has decided on definitely adopting the theory that the Nak-chu-ka river of Tibet is the upper course of the Salwen. The idea occurred to me several years ago on first reading the Pundit Nain Singh's narrative of his journey across Great Tibet from Noh to Lhasa, but the gaps in the chain of information then available were too great to enable me to arrive at any very confident conclusion on the subject. The chief difficulty seemed to me in reconciling the enormous drainage said by the Pundit to be absorbed by the Nak-chu-ka river in flood season, with the comparatively modest dimensions of the Salwen. For a better comprehension of this point it is necessary to refer to the Pundit's map, and I am almost afraid that it is not readily accessible in this country. The extremely interesting report with its accompanying maps was, I believe, suppressed by Lord Lytton's order in 1877, and the solitary copy which found its way to the library of the Royal Geographical Society has, I observe, no maps. However, from the smaller edition published in the Journal of the Royal Geographical Society for 1877, it will be seen that though no precise idea of the area of the catchment-basin of the Nak-chu-ka can be derived therefrom, yet at least fourteen lakes of different sizes, varying up to one of about one hundred miles in length, drain into this river, and that its farthest source appears to lie as far west as 83° 30′ E. of Greenwich, or something like 500 miles from the point where the Peking road crosses it. Several of its tributaries crossed by the Pundit are described by him as "considerable, one hundred paces in width, &c."; and when we remember that his journey was in the autumn and winter, it will be realised how large the bulk of the combined streams must be in spring or early summer.

The question of the future course of this large river seemed to be so important, that I ventured to call the attention of the late Major W. Gill to the point, and asked him as to the respective dimensions of the Mekong and Salwen, and also whether he could throw any further light on the matter.

I need no apology for reproducing the reply of so distinguished an explorer.

1, Edinburgh Mansions, Victoria Street,
21*st October*.*

Dear Sir,—I crossed the Lan-Ts'ang or Mekong river on the 10th October, 1877. The bridge is at an altitude of 4000 feet above the sea, and is 50 yards long.

The river seemed to me to be full, it was as wide as the bridge was long; it was flowing swiftly—a rolling stream without broken water; it had the appearance of considerable depth; it was muddy, and ran between desperately steep hillsides, giving me the idea of a big river choked up by the narrowness of the gorge.

I crossed the Lu, or Lu-tze, or Salwen river on the 15th October, 1877. The bridge is at an altitude of 2500 feet above the sea, and is in two spans, the eastern

* 1878.

73, and the western 52 yards long. There was no water under the western span; the eastern was tolerably full, the water was broken, and therefore could not have been very deep; it did not give me the impression of carrying as much water as the Lan-Ts'ang, but it clearly was not full at the time of my visit.

To turn to the Pundit's paper. A route going nearly due east from Nak-chu-ka must cross the Chin-Sha-Chiang,* and may cross the Lu-Chiang and the Lan-Ts'ang-Chiang.

There can be no doubt that the great river Di-Chu, of which the Pundit speaks, is the great river of China, the Chin-Sha. I have crossed the whole drainage lower down, and there is nothing else that could be indicated.

Thus far we get with certainty, and now we have two other streams on the west of the Di-Chu.

The Pundit says that the Sha-Chu and the Nak-chu-ka both flow to Chiamdo.

If this is true they are both branches of the Lan-Ts'ang (otherwise called the Mekong) river; for we know certainly that Chiamdo is on the Lan-Ts'ang.

If, however, this is true we cut off the Lu-Chiang (or Salwen) and give it a very small area whence to draw its supplies. We cut it off at about the latitude of Chiamdo, at which point we have already given to the Lan-Ts'ang two big rivers.

Further, Chiamdo must lie at an altitude of at least 10,000 feet; if the Nak-chu-ka flows to it, it must be a very gentle stream, and one would think that a road would be found by it, in preference to the awful tracks described by Huc. I am therefore of opinion that the Nak-chu-ka is the Lu-Chiang and that the informant of the Pundit was wrong when he said it went to Chiamdo.

Further, we have two big rivers, and two big rivers only, the Lan-Ts'ang and the Lu-Chiang; it is quite certain that there are no other big rivers. It seems probable that they both rise north of the latitude of Nak-chu-ka.

Does it not therefore seem rational to assume that the two rivers crossed by the route are the two rivers, the Lan-T'sang and the Lu?

Captain Trotter has applied the term Ya-Lung to the Di-Chu of the Pundit, and in the next sentence speaks of the *Eastern* Jha-Chu as the Yang-Tzŭ. I am at a loss to understand how he can have fallen into such an error.

The Ya-Lung-Chiang is a well-known tributary of the Yang-Tzŭ crossed by me at Ho-K'ou, and runs into the Yang-Tzŭ at Kia-Ting-Fu, being a tributary on the left bank of the Yang-Tzŭ and not on the right bank as placed by Captain Trotter.

If this route of the Pundit's has any existence then the Eastern Jha-Chu would be the Ya-Lung-Chiang, the only river of importance between Bath'ang and Ta-Chien-Lu.

Where Chering Chitshum and the Eastern Ma-chu of the Pundit may be I cannot say, but there is a direct northern road from near Ta-Chien-Lu to Chiamdo, and there is no reason why another still more northern should not exist; Chering Chitshum is clearly, according to the Pundit, on a river of no importance, and might be either one or another of the streams that join the Yang-Tzŭ, it might even be the Ta-Chien-Lu stream itself—but the names are puzzling.

I have assumed that the Pundit's route does not go into the valley of the Huang-Ho or Great Yellow River of China, because all the rivers appear to flow from north to south, but this is not too clear and might be worth looking into.

It is worth noting that Huc only mentions one river of importance between

* The Chin-Sha-Chiang or golden sand river, known lower down as the Yang-Tzŭ-Chiang or ocean river and called by the French the Blue River (why no one can say). —[W. G.]

Lhasa and Chiamdo, and this would on my theory be the Nak-chu-ka or Lu-Chiang, or as it is also called Lu-Tze-Chiang, or further down the Salwen.

Huc's map must not even be looked at for he clearly knew nothing of the geography of the country he visited.

Believe me to be, dear sir,

Yours very truly,

William Gill.

Setting aside the minor question of the particular route referred to by the Pundit, it will be seen that the late Major Gill quite fell in with the theory of the identity of the Nak-chu-ka and the Salwen, although the apparently inferior body of water conveyed by the latter river as compared with the Mekong, might have made him hesitate before ascribing so extensive a catchment-basin as the Nak-chu-ka possesses, to the smaller stream. The explanation of this difference of bulk may however be found in the probability that the Salwen derives its upper waters (according to the theory we are going upon) from a drier though larger area than the Mekong. During the melting of the snows one would expect the condition of things to be reversed.

Klaproth's map of Central Asia shows the connection between the Khara-ussu and the Lu-kiang, and Mr. T. Saunders, in his map of 'The Himalaya and Tibet' to the second edition of Mr. Markham's 'Tibet: Bogle and Manning,' adopted this view in 1879.

Moreover, there is another eminent authority on the same side, Baron F. von Richthofen. In the first volume of his 'China' (see pages 129 and 263, note) the Baron states, apparently without any doubt, that the river, the Mongolian name of which is Khara-ussu and the Tibetan Nam-chu (this seems to be a mistake for Nak-chu; Nam-chu means "sky-water," not "black water" which Khara-ussu and Nak-chu both mean), flows out of a chain of steppe lakes, and is one of the head streams (*Quellflüssen*) of the Lu-kiang or Salwen. And this conclusion of the Baron's is the more remarkable, as he would not seem to have been then aware of Nain Singh's researches, owing to the above-mentioned suppression of the report, though it was printed some time before the publication of 'China.'

I may mention one point which has caused a little confusion, i. e. the occurrence of the word Tsiamdo. The Pundit was informed that the Nak-chu-ka river flowed to Tsiamdo, a statement which misled Captain Trotter and apparently Major Gill as well, as it was assumed that Tsiamdo on the Upper Lan-Ts'ang-chiang was meant. There are more than one, if not several Tsiamdos in Tibet, and I believe the word only signifies a confluence of two streams (= Coblenz). It appears to me quite possible that the Pundit's informant may have used the word in its physical and general sense, and not necessarily intended to denote a town.

There is, it will be seen, an enormous *lacuna* in our geographical knowledge of the river if it may be permitted to speak of it as one and the same. From the point where the Pekin road crosses it, just to the east of the Nak-chu or Nap-chu village, to where Mr. Margary and Major Gill crossed it on the way to Bhamo, there is very little known of this great river, though the Abbé Huc must have passed over it, and of late years the French missionaries have contributed some slight information about its course near the latitude of Batang.

The new and important journey made by the late Pundit's former pupil, will no doubt throw much light on the question, for he must have crossed the river more than once. One could well understand that rivers flowing in such straitened gorges as seem to exist on the south-eastern confines of Tibet, would not impress a casual spectator as being anything of very great importance, but an experienced surveyor

like the native explorer (whose identification, alas! is more hopeless than ever, for from a mere initial it has now been whittled down to nothing at all!), would be pretty sure to collect all possible data and not to trust to the mere appearance of a river. I am sure most geographers will join in hoping that the results of this remarkable journey may soon be given to the world. One indirect result would doubtless be to throw light on the course of this river which partly runs through British territory and which, if the above theory is correct, must be over 2000 miles in length.

I am, sir,
Your obedient servant,
CHARLES E. D. BLACK.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

SOUTHPORT MEETING, 1883.

[*Concluded from p.* 625.]

The following papers were read to the Section:—

A Visit to Mr. Stanley's Stations on the River Congo. By H. H. JOHNSTON.—Printed *in extenso*, with map, in the preceding number of R. G. S. Proceedings.

On the Athabasca District of the Canadian North-West Territory. By the Rev. ÉMILE PETITOT.—This paper, with accompanying maps, received by the Society from the author (to whom the Back Grant was recently awarded), is printed in full in the present number. See *anteà*, p. 633.

On the Hot Springs of Iceland and New Zealand, with Notes on Maori Customs. By CUTHBERT E. PEEK, F.R.G.S.—The author commenced by giving a description of the hot springs of Iceland and New Zealand, both of which have been recently visited by him. Several most important differences were noticed in their composition; in the case of the hot mud wells of Iceland, there is so much copper suspended in the mud that several companies have been started to work them commercially; while the mud springs of New Zealand are so full of Infusoria that in time of famine the natives manage to sustain life on a diet chiefly consisting of mud. Some of the New Zealand springs contain a very large percentage of mineral (over 121 grains per gallon, chiefly chloride of sodium, in one of the most powerful). The hot springs of New Zealand appear to extend from Mount Tongariro, at the south-west end of the system, to White Island, at the north-east extremity. On April 25th Tongariro was observed to be giving out more smoke than since 1870, when a considerable eruption took place.

Notes on the Territory of Arizona. By LITTON FORBES, M.D., F.R.G.S.—The author, after alluding to the general ignorance as to the rich territory of Arizona, pointed out that it was now practically opened up for the first time in its history, by the completion in the last days of May 1883 of the new Atlantic and Pacific Railway, which will probably revolutionise before long the existing lines of travel, not only to Australia, but also to China and Japan. This new line, which may be considered an extension westward of the great trunk line of the Atchison, Topeka, and Santa Fé, runs from the old Spanish-American city of Albuquerque in

New Mexico, passes through the northern portions of Arizona, and joins the Southern Pacific at Mojave in California. It thus forms a complete trans-continental line, on a parallel considerably to the south of any previously existing line. Its indirect connection, however, with the Southern Pacific and the new Sonora line in Mexico is extremely important. The Sonora line has its terminus at the port of Guaymas, on the Gulf of California. Here probably, in the not far distant future, will be the new port of arrival, at least for mails and passengers bound eastwards from Australia, China, and Japan. At present, Guaymas is a small Mexican town, consisting of adobe houses. Its harbour, however, is an excellent one, with deep water up to the very shore, and well sheltered from every wind. It is the only possible mail station on the Gulf of California, and is some five hundred miles, or nearly two days' steaming, nearer Australia than is San Francisco. The new Atlantic and Pacific line, in its course through Northern Arizona, also opens up a very important tract of country. Of all the western territories, Arizona has long been the most remote and inaccessible, and therefore the least known. It has been neglected in turn by the miner, the stock-raiser, and the farmer. The aridity of the climate, and the presence of hostile Apache Indians, have had much to do with this, but it has been due in a still greater degree to the want of suitable means of communication. As the territory is now provided with two distinct systems of railways, it is believed that the long isolation from which the country has suffered since the days of the Spanish conquerors, will soon be broken through. Arizona is a country of extraordinary mineral wealth. In many parts of its extensive territory it offers large tracts of excellent land to the farmer and stock-raiser. Its chief drawback is a want of water, but this can be supplied as required by irrigation works and artesian wells. Coal, salt, and the precious metals exist in Arizona in larger quantities probably than in any of the western mining territories. The copper mines are even now the richest known, but as the country is opened up, still greater returns may reasonably be expected. The area of the territory is about 114,000 square miles, or approximately 73,000,000 acres; in other words, three times the size of the State of New York. The general topography of the country is that of a plateau sloping towards the south and west from an altitude of 7000 feet to the sea-level. The surface of Arizona is much diversified, and contains some of the finest scenery in North America. In no country of the world can the evidences of past geological action be better studied. The cañon of the Colorado is a stupendous water-worn chasm, 400 miles long, and from a quarter of a mile to a mile and a quarter in depth. The scenery in many parts of Arizona is grand and impressive; in others, the landscape is little better than a desert. The whole country is still a strange mixture of the old and new. Life there is in its main features much the same as it was when Coronado, in 1540, led his bands of Castilians through the country in search of the "Seven Cities." But this phase of existence is rapidly passing away, and before long Arizona will awake from the sleep of centuries which has till now weighed upon her.

On Kairwan. By Edward Rae, F.R.G.S.—The author, who visited the holy city in 1877, gave a sketch of its past and present topography, with a more detailed account of its history. Till the last few years, no city of Kairwan's importance and antecedents was so little known; for Christians could only visit it at great risk. In 1835 the Marquis of Waterford was stoned; and in 1877 Mr. Rae was cursed and threatened, and his servant had to escape for his life.

Kairwan—founded, according to Mohammedan tradition, by divine inspiration—rapidly grew in extent and power. Its mosque with five hundred columns, its vast population, its gorgeous summer-palaces, its caravan trade, its wealth and learning, its marvellous conquests, but above all, its inviolate and holy character as a city of

pilgrimage, made it one of the wonders of the Mohammedan world, and it has left imperishable traces upon science, commerce, and the arts—in fact, upon civilisation generally.

A Journey in Russian Central Asia, including Kulja, Bokhara, and Khiva. By the Rev. Henry Lansdell, D.D., F.R.G.S.—The author described a six months' journey performed by him during the latter half of 1882, of 12,145 miles (5000 by rail, 3400 by water, 3000 by road, and 800 in saddle or cradle), having for its principal object the distribution of religious literature in prisons and hospitals, and the collection of ethnological and general information.

Leaving London, June 26th, the author arrived at Tobolsk on August 12th, and steamed up the Irtish to Omsk, the capital of the new general government of the Steppe, lately formed of the provinces of Akmolinsk and Semipalatinsk out of Western Siberia and the province of Semiretchia, hitherto part of Russian Turkistan. This general government, with that of Turkistan (consisting of the provinces of Syr Daria, Amu Daria, Fergana, and Zerafshan), now makes up "Russian Central Asia." In fourteen days from August 19th, the author posted 1198 miles through Semipalatinsk, over the Chingiz-tau, the east end of Lake Balkash, and up the Ili valley to Kulja. Here he visited a Sibo encampment, and the Chinese governor at Suidun, after which he followed the post road through the towns of Auli-Ata, Vernoi, and Chimkend, to Tashkend. Dr. Lansdell then proceeded southwards to Kokand and Samarcand, and crossed the Hissar Mountains at the Takhta-Karacha Pass (5180 feet) to Shehr-i-Sebz, where he was received by the Emir of Bokhara, and treated as a guest during his stay in the Khanate. Proceeding thence 148 miles, through Chirakshi and Karshi, he arrived on the sixth day at the city of Bokhara. Leaving this place on August 16th, he passed through Kara-kul, and across the Sundukli sands to Charjui, a journey of 48 miles in three days, and then, with six horses, a tarantass, two interpreters, eight oarsmen, and five mounted guards on shore as a protection from the Turkomans, he floated 300 miles down the Amu-daria, to the Russian fort Petro-Alexandrovsk, reaching it safely on October 26th. Dr. Lansdell then re-crossed the Oxus to Khiva, and twice had audience of the Khan, after which he left on November 2nd for a journey of 107 miles on horseback through the cultivated districts of Shahkhavat, Tashaus, and Ilyali, to Kunya Urgentch, where a most interesting visit was paid to ruins said to date from the time of Genghis Khan. The author next prepared, with two interpreters, two camel-drivers, two horses, and five camels, to cross the Aralo-Caspian desert. Proceeding by the well of Karategin, the last shepherd was spoken with on November 10th, after which the party met no human beings for eleven days. The route lay along the old Oxus bed to the Sarykamish Lake, and then continued in a south-westerly direction to wells at Uzun-kuyu, and Kazakhli, after which the travellers descended into the dry bed of an inland sea, and skirted the cliffs of Kaplan Kir. The wells of Sekhiskhan and Tuer were passed, after which, from the summit of the Sari-baba Hills was seen the Kara-Boghaz bay of the Caspian. The well of Demerdjen was safely reached, Siuli was passed, and on November 22nd, after a journey of 403 miles from Kunya Urgentch, the party arrived at Krasnovodsk. Dr. Lansdell then crossed the Caspian to Baku, whence, after visiting the oil wells and naphtha fires of the neighbourhood, he proceeded by the new but then unopened railway to Tiflis, and so home by Poti and Odessa, having fully accomplished the objects of his journey.

On the Volcanic and Earthquake Regions of Central America, with Observations on Recent Phenomena. By William Hancock, Chinese Imperial Customs Service.—The author entered Mexico at Acapulco on November 12th last year. Crossing the Rio de la Venta, he arrived at La Providencia on a table-land

at 2000 feet, and at the base of the Sierra Madre, then examining the extinct volcano of Zapotilla (3000 feet). From Mexico he travelled by sea to San José de Guatemala, and thence to the lake of Amatitlan. The volcano of Pacaya (8400 feet) was ascended from this point. A regular truncated cone rises from the interior of an ancient crater. The summit contains a crater, about 250 feet in diameter by 100 feet deep; the circumference is fissured, and moderate volumes of steam were issuing from the fissures. Chemical action was not apparent. The last great eruption was in 1775. A parasitic cone exists against one side of the ancient crater rim in the interior.

Between Amatitlan and Guatemala enormous deposits of pumice were passed. The Guatemala plateau approaches the lake in an escarpment exhibiting a trachytic formation. The region round the volcanoes Agua, Fuego, and Acatenango was visited. The last eruption of Fuego was in July 1880; lava was discharged on the Pacific slope. During the author's residence in the district, *retumbos*, or underground rumblings, were not infrequent. From Guatemala, Salvador was reached, and the volcano of Izalco ascended as far as possible. The eruptions occurred on an average once in thirteen minutes; the smoke and vapour rose to from 1000 to 2000 feet above the crater; showers of pumice and sand were ejected. Several slight earthquake shocks were experienced at San Salvador. The lake of Ilopango was visited, and also the volcano in the centre, which came up on January 20th, 1880, and is gradually sinking again. Between December 24th and 30th, 1879, 372 earthquake shocks were recorded at the lake side. The water had a strong odour of sulphuretted hydrogen. From Salvador the author proceeded to La Union in the Gulf of Fonseca. The islands are all extinct volcanoes. Cosiguina was passed. During the eruption of January 20th, 1835, the ashes were carried to Jamaica and Santa Fé de Bogota, and the explosions were heard at Belize, 800 miles distant. Journeying from Corinto to Managua in Nicaragua, the volcanoes of El Viejo, Santa Clara, Telica Orota, Acosusco, Las Pilas, and Momotombo were passed. Momotombo rises from the edge of the lake. Near Managua the sunken craters filled with water, Tiscapa, Nihapa, and Asosoca, were examined, and the volcano of Masaya was ascended. The twin volcano of Nindiri exhibits an ancient crater, shallow, and having a flat, circular floor. Subsequently it burst again into eruption from two new craters, one at each side and within the original crater, and the undermining by the expulsion of lava caused the original floor to drop in three steps, leaving terraces all round.

The author considers that the existing volcanoes of Masaya and Nindiri are merely cones in the centre of a flat crater about twenty miles in circumference. The lake of Masaya is included within the walls. It is approached by a path down the face of a craterous precipice, 350 feet in height; the lake is 400 feet deep. The volcano of Mombacho was seen at Granada, and several of the volcanic islands in the lake of Nicaragua were visited, including Zapatera, which exhibits a sunk crater filled with water. The author was prevented from visiting the adjacent island of Ometepec through unfavourable weather; since then (February), according to accounts received, the volcano of the same name has broken out in eruption after years of repose, and the inhabitants have retired from the island.

On New Guinea. By Coutts Trotter, F.R.G.S.—A sketch of the physical geography, natural resources, and character of the inhabitants, in which the author attributes the prevailing ignorance and indifference on the subject to causes which have ceased to operate, such as, 1st, the difficulties of the navigation, now minimised by steam; 2nd, the exclusive system of the Dutch in the Spice Islands, which prevented access to regions to the east of them; and, latterly, the diversion of the stream of enterprise towards Australia. As regards the first, the unsurveyed reefs and channels of Torres Straits, the concentrated violence of the

monsoon there, and the mud flats and shallows further west, were even more formidable to sailing vessels on the southern coasts than the usually precipitous and harbourless character of the northern.

New Guinea was actually discovered, by the Portuguese or Spaniards, in 1526–8. More is probably due to the early Spanish navigators than is commonly supposed; in fact, by the time of Torres (who achieved the south passage in 1606, though this is shown, mysteriously, in a map of earlier date) the whole outline of the island was roughly known, except the northern coast east of Cape Finisterre.

The author traces its geological relations with Australia, showing the date of their separation to be probably not earlier than the Lower Miocene, shells of that age being found on the east of the Gulf of Papua identical with those of the same series in Victoria and South Australia. Of the New Guinea Amphibia, too, those not of wide distribution are exclusively Australian. On the west of the Gulf of Papua, from the swampy plains intersected by the Fly and other streams which bring down the drainage from the mountainous interior, isolated hills of Australian character rise abruptly, which apparently, like the islands of Torres Straits, escaped submersion. These plains, since they emerged, have been mainly occupied by an Indo-Malay vegetation. Westwards as far as Princess Marianne Island the sea is so shallow and the coast so low, that nothing is visible from shipboard. Here a great submarine bank extends to the Aru Islands, which Mr. Wallace shows to have formed part of the mainland. The west and north coasts are mainly precipitous—the cliffs frequently of recent limestone, with raised coral beaches—broken by considerable rivers, with flat mangrove-covered banks, affording access to the interior. Otherwise the densely-wooded mountain ranges make such access very difficult, though opposite New Britain these rise in fertile terraces or plateaus. The north coasts are almost free from reefs, but the south coast of the east peninsula is skirted by one at a distance of five to six miles, thus forming valuable harbours and anchorages. Vessels stationed here would command the passage both of Torres Straits, through which passes a yearly increasing traffic with India and Europe, and of the neighbouring China Straits, the direct route from Australia to China. The interior here consists of ranges of rolling grassy hills with scattered timber of eucalyptus, acacia, &c., interspersed by streams, and very fertile tracts well fitted for sugar and other tropical cultivation. Beyond is the central Owen Stanley range, 13,000 feet high. Here the rocks, judging from small fragments of mica slate, quartz, sandstones, greenstones, and jasperoids, are indistinguishable from the Devonian and Silurian series of the gold-fields of New South Wales; but gold has hitherto been found only in very small quantities. Rocks of similar age occur in the north-west peninsula; the central mountains there, the Arfak, seem mainly granite and gneiss. Severe earthquakes occur on the north coast, but no active volcanoes have been seen. They may exist; Mr. W. Powell observed a mass of pumice at a considerable height, opposite to New Britain, but the great volcanic energies of that island seem to die away in the smaller islands to the westward, and to pass north-west through the Schouten Islands towards the Moluccas and Philippines. The forests contain magnificent timber trees, spices, barks, and gums. The sago-palm and sugar may become great staples.

There are also tracts of land well suited for cattle raising, but it is a question how far the best lands are unoccupied. The natives have a keen sense of rights not only in the soil, but in the fruits of the forest trees, and the fish in the streams belonging to the tribe; and probably would not work regularly for Europeans. Perhaps confidence might be best created first by establishing trading depôts, for there is already an active trade between the hill and coast tribes in their respective produce and manufactures, and in Western New Guinea a small foreign trade with the Malays

and Chinese. Sago, massoi bark, and bird-skins are the chief exports, but the wants of the people as yet are very few.

The mass of the people are of that negroid race which, variously modified by Malay, Polynesian, and other elements, extends from Flores eastward through New Guinea as far as Fiji and New Caledonia. There is no political organisation, the tribes being isolated and the power of the chiefs small; hereditary rank, though a Polynesian, is not a genuine Papuan conception. The level of civilisation varies. Some tribes are at a very low level; others are skilful and industrious cultivators; their agriculture seems to be a tradition from Asia, and most of the plants of cultivation are Asiatic. Cannibalism is not common, and perhaps confined mainly to war time, when the heads of enemies are taken and treasured. Religion consists mainly of ancestor worship, the Karwar or image of a (recently) dead progenitor being greatly venerated, for the spirit of the dead passes into it, so that a man would rather sell the skull than the Karwar of his father. They dread the spirits of the dead, especially of their enemies, and one or two beings not of human origin. They show a marked feeling for art in the ornamentation of their houses, weapons, tools, and ornaments. They are a rude, boisterous, independent people, with doubtful capacities for culture, though the children in the Dutch mission schools do well. The Malay custom of building the houses on piles is general, but small houses are also built on the ground as in other Melanesian islands, or high up in trees, as in the Solomons. The eastern peninsula is partly occupied by a different race, fairer and milder, with Polynesian affinities, but their religion has none of the distinguishing Polynesian characteristics, and indeed seems more rudimentary than the Papuan. Their relations with English explorers have been exceptionally good, and it is hoped that steps will be taken to regulate the intercourse with Europeans before serious collisions occur. With our great experience much might be done in this respect, and the protection thus afforded to the people would more than compensate for interference with individual liberty.

The people of the north coast generally are finer than those of the south; and the author suggests, in explanation, that the former have probably been recruited, to a much greater extent than the others, from the emigration passing eastwards at different periods, from Asia to the Pacific, while the intercourse of the south coast has been mainly with the inferior Australians.

Curious claims over New Guinea have been asserted, since the spread of Islam in the Archipelago in the fifteenth century, by the Malay rulers of the diminutive islands Bachian, Gébé, and Tidore. The Dutch base their claims on the last, as being his suzerain, and have annexed the western part as far as 140° 47′ E. But the Tidore claims never extended so far east, or indeed inland at all, being enforced only by periodical raids for tribute or slaves, which have checked civilisation, or perhaps thrown it back, for we read not only of Papuan pirate fleets during the last century, but of a league of "the Papuas" with the Moluccas in the 16th century against the Portuguese. The Dutch tenure has hitherto been little more than nominal.

Disclaiming controversy, the author points out that with the present tendency of matters in the Pacific, and the certainty that the development of New Guinea must be the work of English hands and capital, its separation from the Australian system, to which it naturally belongs, would be a grave political inconvenience, crippling the future of that system, and necessitating greatly increased armaments;—to say nothing of such evils as the presence of foreign convict settlements, or (if the island remains unannexed) of an Alsatia of foreign adventurers.

On the Advance of the Southern Chinese. By Holt S. Hallett, M.I.C.E., F.R.G.S.—The following are the chief historic facts and dates brought forward by the author:—The Chinese Emperor Yaou, who came to the throne B.C. 2356, sent the

family, or tribe, of Hi to take the government of the country to the south of the Yangtsi. Kingdoms thus formed extended to the south of Tonquin, B.C. 2208.

The Annamites and Shans trace their earliest dynasties to Chinese imperial families. Their kingdoms were in existence within the bounds of the Chinese empire before its earliest contraction. Previous to the abolition of feudalism, B.C. 246, the empire was divided into a varying number of principalities, whose dependence varied with the power of the reigning emperor. By B.C. 1550, owing to revolts, it had contracted to within the northern bank of the Yangtsi Kiang; and during the Chou dynasty, B.C. 1134–255, seldom included any portion of the basin of that river.

The founder of the Chou dynasty divided the empire into seventy-two principalities, and appointed his relations as rulers over them. His elder brother left the empire, and founded the kingdoms of Youe and Hou on the frontiers of Ssŭ-ch'uan. The rulers of the kingdoms left outside by the contraction of the empire still hold the title of Chou that was borne by the princes of the Chinese empire. Other evidence leads to the conviction that the Shans formed part of the early Chinese horde. M. Terrien de Lacouperie allows that over 30 per cent. of the Shan vocabulary has come from the same source as that of the Chinese.

Long before the time of Gaudama, B.C. 543, the Yun Shans had founded towns to the south of Yunnan, and were pushing down the valley of the Mekong through the Yun or Karen country. These Karens, there is reason to believe, were the furthest advance party of the Chinese immigration; for a long period they ruled over the kingdom of Youe-chang (Tchen-Tching, Lin-y, or Lam-ap), and in the fourth century over Cambodia. In A.D. 431 the Yun Shans founded several cities in the valley of the Menam, and by 707 they had overrun and occupied the northern half of Cambodia.

Early in the sixth century B.C., the Mau Shans entered the valley of the Irrawadi, and drove the Burmese tribes to the southward. About A.D. 1220, they annexed Assam, and became predominant over the Shan States to the east and west of the Salween as far south as Zimmé. By the end of the thirteenth century, they had shattered the Burmese Empire, driven the Yun Shans to Chaliang (from whence the latter descended and founded the kingdom of Siam), attacked Java, Malacca, and Cambodia, annexed part of Pegu, and extended their sway over the Malay Peninsula as far south as Tavoy. From this time to A.D. 1554, Shan princes were ruling in the valleys of the Irrawadi, Sittang, and Salween, as well as in the country to the south of Yunnan, as far eastward as Cochin China.

The Laos Shans were settled in the country to the west of Tongking at a very early date, and had already wedged themselves into the Yun country, as far south as Vien Chang, before the arrival of the Yun Shans in the valley of the Menam; they are, therefore, known to their neighbours as the Lau, or Lao, which means ancient or old.

Curiosities of Travel on the Tibetan Border. By E. Colborne Baber, F.R.G.S., Chinese Secretary of Legation, Peking.—The author endeavoured in this paper to show from his limited experiences on the Tibetan border-lands of China, how vast was the field of research still open to explorers, entirely apart from mere travel in unknown countries; and he strongly urged the necessity of the employment of scientifically trained observers. The first instance adduced was his inability to describe the economy and parasites of the wax-insect of Western China, the eggs of which are transported from a valley on the border of Yunnan to a plain in Western Ssŭ-ch'uan, a distance of more than 200 miles. A great multitude of carriers—ten thousand or more in number, travelling in single file all through the night, and resting by day—convey the galls to their destination, where they are

attached to trees, on which the insects deposit wax and breed. The second was his ignorance of the formation and botanical name of a certain kind of timber, used to make coffins, and of extraordinary value on account of its resistance to the attacks of insects and rot. This is found buried deeply in the soil, and is actually mined for, either by sinking shafts or by a process of "hydraulicing." The trunks are of great size, and a coffin made of the planks which they afford is worth some 300*l*. This valuable material is found imbedded in a hard yellow clay, which Mr. Baber suggests may be the till or boulder-clay. The sub-Himalayan region in question exhibits manifest traces of glaciers, by which, according to the latest school of geologists, the till has been formed.

The concluding observations were of zoological interest, having reference to an antelope with horns united at the base, which may have given rise to Abbé Huc's fable of the unicorn.

On North Formosa. By William Hancock.—The author was resident in Tamsui for the greater part of 1881, during which period he had opportunities of examining the geology, fauna, and flora of the district. He described the steam geysers and extinct craters, the peculiar lava-field near Tamsui, and the various earthquake shocks which have taken place, especially that of December 1867, when the towns of Kelung, Tamsui, and Pachena were all more or less ruined, and the sea retired from the harbour of Kelung, and, returning in the form of two waves, overwhelmed a number of the inhabitants. The peculiarities of the flora and its relations to that of the opposite mainland of China and the island of Hainan were pointed out, the wealth of flowers in a temperate as compared with a tropical zone being referred to, and allusion made to the remarkable floral display in the province of Chekiang during the spring months, when many of the most conspicuous British greenhouse shrubs are to be seen on the mountains. Mr. Hancock also described the aborigines of this part of the island, with their manners and customs (especially the different forms of tattoo in the male and female), their wonderful agility, and mode of hunting. Having succeeded in making friends with a chief, he was taken into the forest, hostages having been left in the hands of the Chinese. The forest presented a marvellous wealth of tropical and semi-tropical vegetation, camphor-trees being especially conspicuous, whilst ferns, more particularly *Hymenophyllum*, clothed the trunks. The impression left by the savages was pleasant, and they seemed to discriminate between a foreigner and the Chinese. Typhoons are prevalent, and have disastrous consequences; they seem to have their origin generally in the sea between the Philippines and Hainan, passing up the coast of China and crossing to Japan. The volcanic relations between Formosa and Japan on the one hand and the Philippines on the other, were referred to, the island being described as a link in the great Plutonic chain extending from Kamchatka to the East Indies.

Noss-Vey and the South-West of Madagascar. By the Rev. S. J. Perry, F.R.S.—The Government Expedition for the observation of the Transit of Venus on December 6th, 1882, was the occasion of a visit to the south-west of Madagascar. The observers were the Rev. S. J. Perry and the Rev. W. Sidgreaves, accompanied by Mr. W. Carlisle. They were landed by Captain Aldrich, R.N., from H.M.S *Dawn*, on the small island of Noss-Vey (Sandy island), a few miles south of St. Augustine's Bay and about three miles west of Salar point; and this paper contained the results of their observations of the country and its inhabitants during the stay of a few weeks. After a brief sketch of the history of the establishment of the French and English traders at Noss-Vey, a description was given of the native tribes, their character and general treatment of Europeans, dress, dwellings, religion, charms, and customs. The peculiar state of slavery among the savages of South-

western Madagascar was dwelt upon at some length, and also the nature of the authority exercised by the petty kings. The paper concluded with some remarks on the natural history and climate of Noss-Vey.

On the Somali and Galla Countries. By E. G. Ravenstein, F.R.G.S.—The author, having given a sketch of the history of geographical explorations in these countries, dwelt upon the information available for the compilation by him of the Royal Geographical Society's map of Equatorial Africa, and finally enlarged upon the particulars obtained by the Rev. C. Wakefield from natives. He pointed to Kisimayu as a port presenting peculiar facilities to a traveller desirous of penetrating into the country of the Bworani Galla.

Report of the Committee, consisting of Mr. James Glaisher (Secretary), the Rev. Canon Tristram, and the Rev. F. Lawrence, **for Promoting the Survey of Eastern Palestine.**

1. The Committee of the Palestine Exploration Fund have been endeavouring during the last year to obtain from the Sultan the Firman granting permission for the prosecution of the Survey of Eastern Palestine.

2. Their efforts, aided by the personal influence of Lord Dufferin, have hitherto proved ineffectual. They have therefore decided on taking up another branch of their original prospectus, and will proceed at once with the Geological Survey of Palestine.

3. A great deal of geological work has been done in the country by individual travellers, but up to the present time there has been no expedition specially organised for the purpose of effecting a complete geological survey.

4. The valley of the Jordan and the basin of the Dead Sea have been examined by M. Lartet, whose work on the subject appeared in the year 1864; and by Dr. Fraas, whose report was published in 1867. Papers on the geology of Palestine by English travellers have also appeared in the 'Quarterly Journal of the Geological Society,' and elsewhere, by Messrs. Duncan, Carter, Holland, Bauermann, Huddlestone, and Milne. The Rev. Canon Tristram and Captain Conder have also furnished a large quantity of notes and information on the subject.

5. The Committee of the Exploration Society have been fortunate in securing the services of Professor Hull, F.R.S., LL.D., F.G.S., Director of the Geological Survey of Ireland, for this important work. He proposes to start about the middle of October, accompanied by his son, Dr. E. G. Hull, as medical adviser, and to proceed to examine the country from the south, namely, the Wady Arabah, which runs northward from Akabah to the southern shores of the Dead Sea. Here a base is found in the granites of the Sinai Peninsula. It will also be desirable to penetrate into Moab, along the border of which country the Nubian sandstone comes to the surface; and most important data, bearing on the geological problems, may here be expected. After examining the Wady Arabah and the town of Moab, the party will proceed, by the route which will appear to Professor Hull most convenient, to make a geological reconnaissance of Western Palestine.

6. The expedition will be strengthened by the presence and experience of Captain Kitchener, R.E., formerly one of the officers of the Survey of Western Palestine. Perhaps Lieutenant Mantell, R.E., will also be able to join the party. During the geological operations, the engineers will be instructed to clear up certain points of interest which lie about that part of the country. Thus, they will examine the eastern end of the Tih Desert, and the passes leading up to the plateau, so as to determine the best route for a large body of people travelling northwards from Sinai; they will explore the topographical features of the Arabah east and west, and the southern edge of the Negeb, so as to ascertain the passes from the Tih plateau to the

first terrace; they will examine the sites of Ezion-geber, Elath, Kadesh, and the way of the spies; look for the road or roads by which communication was kept up between Jerusalem and Ezion-geber, the posts on the old Roman road; and throw light, if possible, on the question whether the Israelites did not go over to Arabia Proper, instead of remaining, as is generally supposed, in the Tîh Desert. It is expected that the expedition will accomplish its objects in about four months. The cost of the whole, including publication of results, is estimated under 2000*l.*

Besides the above, the following papers were read:—

On the proposed Jordan Channel. By Trelawny Saunders, F.R.G.S.

On the Jordan Valley. By the Rev. Canon Tristram.

NEW BOOKS.

By E. C. Rye, *Librarian* R.G.S.

EUROPE.

Caix de Saint-Aymour, Vte. de.—Les Pays Sud-Slaves de l'Austro-Hongroie (Croatie, Slavonie, Bosnie, Herzégovine, Dalmatie). Paris (Plon): 1883, 12mo., pp. iv. and 301 [no index], maps and illustrations. (*Dulau*: price 4*s.*)

The author (who was charged with an archæological mission by M. Jules Ferry, French Minister of Public Instruction) visited Bosnia and the Herzegovina in 1879, and spent some two months in the country. His illustrations are mostly from Evans's 'Through Bosnia and Herzegovina during the Insurrection.' The map (scale 1:3,700,000) is of a meagre description.

ASIA.

Aboulféda.—Géographie d'Aboulféda, traduite de l'Arabe en Français et accompagné de Notes par M. Stanislas Guyard. Tome II. Seconde partie. Contenant la fin de la traduction du texte Arabe et l'Index général. Paris [Imprimerie Nationale]: 1883, 4to., pp. viii. & 320. (*Dulau*: price 15*s.*)

The first and part 1 of the second volumes of this translation of Abulfeda's Tacouym-Alboldan were published so long ago as 1848, the work being undertaken by Prof. Reinaud. M. Guyard now completes it, but does not attach so much importance to it as his illustrious predecessor did, in consequence of the original sources of Abulfeda's information having since that date become accessible. The present part includes Syria, Mesopotamia, the Arabian Irak, Khoûzistân or Ahwâz (the ancient Susiana), Fârs or Fârsistân, Kirmân, Sidjistân or Seistân, Sind, Hind (Hindostan), China, the Islands of the Indian Ocean, Roûm (Asia Minor) and adjacent regions, Armenia, Arrân, and Azarbaïdjân, Djabal or 'Irâq al-'Adjam (Persian Irak), Déïlem or Daïlam, and Djîl or Gîlân, Tabaristân, Mâzandarân, and Qoumis, Khorâsân, Zâboulistân and Ghoûr, Tokhâristân and Badakshan, Khârizm, Transoxiana and some attached portions of Turkistan.

A general (historical and geographical) Index for the whole work is given, with another one of authors and their works.

Boüinais [Capt.] A., and Paulus [Prof.] A.—La Cochinchine Contemporaine. Paris (Challamel): 1884 [1883], 8vo., pp. xi. and 490 [no index], map. (*Dulau*: price 7*s.* 6*d.*)

This opportune volume (a part of the Bibliothèque Algérienne et Coloniale, published by Challamel aîné) contains a sketch of the History and physical political, and economic Geography of Cochin China. M. Boüinais, one of the

authors, has held office under Governor Le Myre de Vilers in Cochin China, and the excellent 'Excursions et Reconnaissances' originated by the latter official, and now publishing periodically at Saigon, have supplied much of his information. The map (scale 1 : 900,000 or nearly 14½ miles to the inch) is a reduction of Commandant Bigrel's large 20-sheet map.

Duke, [Surgeon-Major] O. T.—A historical and descriptive Report on the districts of Thal-Chotiali and Harnai, with the adjacent country inhabited by Biluch and Pathan Tribes. Calcutta (Printed at the Foreign Department Press) : 1883, fo., pp. 201, maps.

The author, Assistant to the agent to the Governor-General in Biluchistan, here reports on the Kach, Kowas, Zawar, Sangan and Thal-Chotiali districts, also on the Marri tribe, in short on the hill portion of Sewistan. The name Sewistan, it is observed, is given on most maps to the country between the Bolan Pass and the Derajat, but it has of late passed out of common use amongst the natives of Biluchistan, who only know of Siwi, a small plain at the head of the so-called Kach of Gandawa.

This Report is divided into nine parts, of which the first contains the ancient and modern history of Sewistan, including a geographical and general description of its present condition, with accounts of its traffic and trade, routes and roads, crime, revenue, and political and military arrangements; the second is a complete discussion of Kach, Hamadun, Kowas (conventionally known as the Eastern Panizai country), and the Panizai and Sarangzai Kakars; the third is a like treatment of the Zawar valley (the Harnai district), including a description of the Spin Tarin tribe living in it, and of the Pechi Sheikhs and other small tribes connected with them; the fourth treats of Mian Kach and the Mian Kach Syads; the fifth of Sangan, the Barozai Sirdars and the Panni Pathans; the sixth of the Marri tribe, of whom the author had the management and reduction to order (including a history of the Khetrans and another of the Zarkan Pathans of the Kulu Valley); the seventh of Thal-Chotiali (with separate discussions of Thal-Chotiali and the Shadozais of Tali, the Spin Tarins of Thal, Lunis, Hasanis, Musa Khel, Hamzazai Kakars, and Dumars); and the eighth and ninth of assessments and other revenue details, including a meteorological Register from July 1881 to March 1882.

The modern Sewistan is defined as a triangular stretch of hill and upland country, the irregular base of which rests on 30° 30′ N. lat., whilst its rounded apex reaches 28° 35′ N. lat.; its western angle touches 67° E. long., and its eastern point is at 70° 30′ E. long. Its surface may be roughly calculated at 9856 square miles, and generally speaking may be described as presenting a series of limestone ridges, rising to the dignity of mountains in the main range which extends from the Pil Mountain to the Sialu Peak. The greater portion is in fact an inhospitable wilderness of rock, consisting of bare mountains, hills, hummocks, and confined valleys. Hardly 826 square miles of this area possess a satisfactory supply of perennial water; much fertilising power is however wasted in the floods of the Nari river, but in most of the districts no very great increase of cultivation can be expected. The rain on which the great bulk of the country depends is uncertain and precarious; and the result of the physical conditions is that large settlements cannot be hoped for,—there being indeed nothing to indicate that Sewistan was ever much more populous and prosperous than it is now, with the exception of the Sibi, Barkhan, and Thal plains, where large forts, ruined towns, and traces of extended cultivation indicate great prosperity at a former period.

The geographical outline is followed by some notes on the mammals, fishes, and plants, and tables of rainfall and population, &c.

The portion devoted to routes, of which fifty-three are particularised, contains necessarily most valuable topographical details as to elevations, distances, names, and general information, and is illustrated by maps of the road from Quetta to Sangan (34 miles to the inch), the Bheji route between Sibi and Thal-Chotiali (4 miles to the inch), Captain Hope's sketch of the Aramb Pass, Sangan and Harnai to the Chapar Gorge (4 miles to the inch), and Sibi to Vitakri, with adjacent country. There is also a separate large and well-exc-

cuted map in colours (scale 1 : 500,000, or 7·891 miles to the inch), based on one from the War Office, showing the Sibi and Thal-Chotiali routes connecting the Khojak with the Indus Valley, also the intervening Marri country.

AFRICA.

Crémazy, Laurent.—Notes sur Madagascar. Paris (Berger-Levrault & Cie.): 1883, 8vo., pp. 25. (*Dulau*: price 1s.)

This separate publication of an article in the 'Revue Maritime et Coloniale' contains various topographical and hydrographical details of Bombétok Bay, Baly Bay, Morondava, the territories of Vinangue, King of Simanandrafoutsa, Soumonga, King of Morombé, Laymerize, King of Tuléar, Réfiaille, King of Salar (now succeeded by his brother, Lahétafique), Laïsalam, King of Itampoule and Langrano, Ibart, King of Ampalaze, Tsifany, King of Cape St. Mary, and Béfandile, King of Caramboules Bight, Andrahoume Creek, Ranoufoutsy Bay, and various points on the east coast (the rivers Rarafangane, Mahitsy or Manakara, Masindrano or Mananzary, Rangazavaka or Mahéla, and Mahanoro); also short notes on the Sakalaves of the western coast, as to the right of "Arehar" (an undefined royalty payable out of the goods of any one dying in the king's territory), customs of war, justice, marriage, religion, &c., concluding with observations on tribal origin, and the text of a concession in 1861 by King Laymerize of lands on the west coast to Captains Rosiers and Bellanger.

Girard, B.—Souvenirs de l'Expédition de Tunisie. Paris (Berger-Levrault & Cie.): 1883, 8vo., pp. 56. (*Dulau*: price 2s.)

An unpretentious little work, with no personal reminiscences as suggested by the title, but consisting of useful topographical and geographical details on Tunis, with notes on climate, products, and present condition of the people, &c.

Rohfs, Gerhard.—Expedition zur Erforschung der Libyschen Wüste unter den Auspicien Sr. Hoheit des Chedive von Aegypten Ismail im Winter 1873–74 ausgeführt von Gerhard Rohlfs. III. Geologie und Palaeontologie, bearbeitet von K. A. Zittel, Mitgleid der Expedition. Parts 1 and 2. Cassel (Fischer): 1883, 4to.; Part 1, pp. cxlvii. and 237, map, illustrations, and plates i.—xxxv.; Part 2, pp. 59, plates i.—viii. (*Williams & Norgate*: price 10*l.* and 2*l* 12s.)

Dr. Rohlfs's own part of this extensive work, describing the journey, was published in 1875 in 8vo.; and the second part, like the above, in 4to., by Dr. W. Jordan, comprising the Physical Geography and Meteorology, appeared in the following year. Prof. Zittel, with the assistance of various specialists, now commences the discussion of the geological and palæontological results, under the secondary title of 'Beitraege zur Geologie und Palaeontologie der Libyschen Wüste und der angrenzenden Gebiete von Aegypten.' He himself contributes the geological section in two chapters, one on the Sahara, the other on the Libyan desert proper, the introductory portions of which contain much material of interest as regards physical geography, and also copious references to the literature on the latter area. He is decidedly of opinion that during the diluvial period the Sahara, as well as part of the southern and eastern Mediterranean, was continental; and that the hypothesis of a diluvial Sahara-sea is not substantiated either by its geological construction or by its superficial phenomena. The bulk of the work is occupied by the palæontological section, which contains papers by Schenk, Fuchs, Mayer-Ermar, Schwager, De la Harpe, Pratz, and Loriol. The illustrations (non-palæontological) consist of views of the Jebel Lifte near Gassr Dackel, from the east, the Jebel Omm-el-Renneiem in the Chargeh Oasis (drawn by Schweinfurth), and the Jebel El-Guss Abu Said near Farâfrah. The map is geological, scale 1 : 1,300,000, and covers the Libyan and Arabian deserts.

AMERICA.

Corte-Real.—Les Corte-Real et leurs Voyages au Nouveau-Monde, d'après des documents nouveaux ou peu connus, tirés des Archives de Lisbonne et de Modène. Suivi du texte inédit d'un récit de la troisième expédition de Gaspar Corte-Real, et d'une importante Carte nautique Portugaise de l'année 1502 reproduite ici pour

la première fois. Mémoire lu à l'Académie des Inscriptions et Belles-Lettres dans sa séance du 1er Juin, 1883, par Henry Harrisse. Paris (Ernest Leroux): 1883, text large 8vo., pp. xii. & 272, frontispiece, map in separate case, fo. (*Williams & Norgate*: price 1*l.* 15*s.*)

This work forms No. III. of the "Recueil de Voyages et de Documents pour servir à l'Histoire de la Géographie depuis le XIIIe jusqu'à la fin du XVIe Siècle" published under the direction of MM. Ch. Schefer and Henri Cordier, of which the prior volumes have been noticed in our 'Proceedings.' Mr. Harrisse, whose many former erudite publications on the early voyages to America have been before the geographical and antiquarian world since 1865 (and who now has in the press another extensive history of Columbus, based on documents not before published and contained in the archives of Genoa, Savona, Seville, and Madrid), now reproduces and analyses all evidence obtainable on the family and travels of Gaspar Corte-Real, a Portuguese of noble birth who in 1500 sailed from Lisbon with letters-patent from King Manoel, and returned in safety after visiting populous and verdant western lands. His second journey, undertaken early in the following year, was not so fortunate; for though two of his ships returned to port, the third, with the Commander, was never again seen. His brother Miguel, after waiting for five months, equipped three ships and started to search for the lost explorer,—only to share his unknown fate; and a third expedition sent by the King of Portugal could obtain no trace of the missing ones. There has hitherto been much obscurity both as to the region supposed to have been visited or discovered by Gaspar Corte-Real, and as to his family and life,—the only known evidence being a letter to his brothers in 1501 from Pasquilago, the Venetian ambassador, published at Vicenza in 1507 in the collection of travels "Paesi nouamente retrouati," and two vague Portuguese portulans of an early date in the sixteenth century. Trustworthy genealogical particulars of the Corte-Real family have now however been supplied by letters-patent in the national archives of the Torre do Tombo at Lisbon, some not before published; and a new and interesting account of the third voyage has been afforded by the discovery in the archives of the Este family of a relation sent by Alberto Cantino, a Portuguese correspondent of Hercules, Duke of Ferrara, and who actually witnessed the return to Lisbon of the second of Gaspar's ships on the 11th Oct., 1501. The Duke of Ferrara charged Cantino to obtain a map of the voyages of the Portuguese and Spaniards beyond the seas, and the latter accordingly had one prepared by a Lisbon geographer and sent it to the Duke in the following year. This, according to Mr. Harrisse, the most important cartographic document of the sixteenth century now known, has hitherto remained unnoticed in the private collection of the Dukes of Ferrara at Modena; but he has now obtained a perfect tracing of the section showing the transatlantic discoveries made to 1502 inclusively, and the map accompanying this volume consists of a coloured fac-simile of that part, showing the eastern New World and the European and part of the African western coasts. The text of Cantino's letter accompanying the original map is also given, as establishing the authenticity and fixing the date of this important document.

The editor observes that, apart from the special interest attaching to this planisphere as illustrating the voyages of Corte-Real, geographers will not only recognise in its contours the prototype of the delineations of the new continent which are to be found in all the editions of Ptolemy's Geography published in Italy, Germany, and France to the middle of the 16th century, but will see with surprise that the littoral regions of the Floridan peninsula and of the eastern part of the United States were discovered, explored, and named by navigators of whose names and nationalities we are ignorant, at least a dozen years before the oldest recorded expedition to those regions.

It is considered from the evidence, that Miguel Corte-Real was lost on the coast of Newfoundland, or at the entrance of the Gulf of St. Lawrence.

Quatrelles, —.—Un Parisien dans les Antilles. Saint-Thomas, Puerto-Rico, Le Havane, La Vie de Province sous les tropiques. Paris (Plon): 1883, 12mo., pp. 345, illustrations. (*Dulau*: price 5*s.*)

A popularly written account of West Indian life and aspects, chiefly referring to Cuba.

ARCTIC.

Munk, Jens.—Navigatio Septentrionalis. Med Indledning, Noter, og Kort. Paa ny udgiven af P. Lauridsen. Copenhagen (Gyldendalske Boghandels Forlag; F. Hegel & Son): 1883, small 8vo., pp. lvi. and 58, chart and photolithographs.

This highly interesting little work contains a reprint of Jens Munk's 'Navigatio Septentrionalis,' with a biographical and historical introduction and explanatory notes, and is a very important addition to Arctic literature. The map of Hudson's Bay, and Munk's sketch of his winter quarters, are reproduced by photolithography from the original edition, published at Copenhagen in 1624, and a specimen sheet of the MS., which is still preserved in the library of the Copenhagen University, is given by the same process. There is also a modern chart of Hudson's Bay, identifying the names used by Munk, and containing an inset plan of the mouth of the Churchill river from Robson's 1752 map.

The author remarks that though Jens Munk is the only Dane whose name is associated with the early history of the North-West Passage, the story of his romantic and adventurous career is by no means so well known as it deserves to be. The main facts of his disastrous voyage to Hudson's Bay are indeed matters of history, but as he did not give the latitude of his winter quarters, the exact locality has never been fixed with certainty. The evidence on this point is therefore discussed at some length in the introduction, and with satisfactory results. It is pointed out that in M. Jeremie's 'Relation de la Baie de Hudson' is a circumstantial account of the discovery by some natives of a number of bodies and a cannon at the mouth of the Churchill river; and this was afterwards confirmed by the English engineer Joseph Robson, who states that during the erection of Prince of Wales Fort a cannon with the monogram of King Christian IV. was found in a cove on the south side of the river, and that some huts containing human bones were discovered at the same place. In Robson's 'Account of Hudson's Bay' occurs the following passage;—"Munk, who was sent by the King of Denmark in 1619, wintered in Churchill or Seal river; but I rather think in Churchill river, a brass gun being taken up there some years after Hudson and Button had discovered the Strait and Bay." Captain Smith, of the *California*, also points out, in 1746–7, that besides the discovery of the gun, it is known that the crews of the Danish ships found plenty of wood, and that while there were no trees in lat. 63° 20′, where Munk's winter harbour had been placed by various authors, the country about the Churchill river was at that time well wooded. The courses steered by Munk, and his topographical descriptions, also point to the same locality; and the Churchill was commonly called the "Danish" river as least as late as the middle of the 18th century.

Much light is also thrown on the circumstances attending Munk's death in 1628; and the misleading statements of Isaac De la Peyrère, which have been generally accepted as authentic, are satisfactorily disproved. He stated that shortly before his death, Munk was appointed to command another expedition for the discovery of a North-West Passage, and that on the eve of his departure the king reproached him for his mismanagement in losing his ship on the former voyage. To this Munk made a sharp reply, and the king, losing his temper, struck him with his cane. The unfortunate navigator felt this indignity so much that he took to his bed and died ten days later of a broken heart. Apart from the improbability of one of the king's most trusted and useful officers being sent on such a voyage so soon after the outbreak of the "Thirty Years' War," it is conclusively shown that he was actually serving in the fleet as rear-admiral only a few days before his death, at Stralsund, where he greatly distinguished himself by his bravery, and it is most probable that he died on board his ship in the Baltic Sea. That a second expedition to Hudson's Bay or "New Denmark" had been contemplated, is proved by existing documents, but it was to have sailed in the spring of 1621, seven years before the date fixed by De la Peyrère, and was probably abandoned because Munk's health was broken by the terrible sufferings he had so lately undergone, and everything tends to show that he was always held in the highest favour and esteem by his

sovereign. The Journal itself is one of the most touching documents ever penned, and the sufferings of Munk and his crews, and the gradual death of sixty-one persons before the eyes of the three survivors, form a tragic chapter in the history of Arctic exploration. His book, however, is full of manly resignation, and, although himself reduced to the last extremity, he continued to tend and encourage the sick and dying until he was no longer able to crawl about. His subsequent escape and voyage to Europe with only two men is one of the most extraordinary feats of seamanship and endurance on record, and he well deserves an honourable place among the pioneers of the North-West Passage.

Steenstrup, Japetus.—Zenierne Reiser i Norden. En kritisk fremstilling af det sidste tiaars vigtige bidrag til forstaaelsen af Venetianerne Zeni's ophold i Norden fra 1391 til 1405. Copenhagen (Thieles Bogtrykkeri): 1883, 8vo., pp. 160, appendices, maps, and facsimiles.

This work (published separately out of the 'Aarbøger for Nordisk Oldkyndighed og Historie' for 1883), is a very elaborate critical review of Mr. R. H. Major's 'Voyages of the Zeni,' 'Zeniernes Reise til Norden' by Frederik Krarup, and the papers on Zeno's Frislanda in vol. xlix. of the R. G. Society's 'Journal.' The original map of the Zeni is reproduced on a small scale, with a facsimile of the part containing "Frisland" placed side by side with a lithograph of Gunnlaugsson's Iceland, part of Johannes Meyer's maps of North Friesland from Danckwerth's Description of Slesvig, and facsimiles of "Engronelant" from the map of the Zeni and from Donis's map. The appendices contain a critical notice of Baron Nordenskiöld's dissertation 'Om Bröderna Zenos Resor,' &c.,* which Professor Steenstrup was not aware of until his own treatise was almost printed, and eighteen pages of elaborately worked out explanatory notes.

Professor Steenstrup entirely disagrees with Mr. Major's identification of Zeno's Frislanda with the Færöe Islands, and contends that while such names as Suderöfjord, Strömö, Portland, and Andefjord are common to other northern countries, their positions on the "Frisland" of the Zeno map do not correspond with the modern map of the Færöe Islands. Thus, he says, "Andefort" is on the north-western side of Zeno's "Frisland," but belongs to the eastern group of the Færöes; and "Streme" is far down on the south-east of Frisland, while the modern Strömö is the largest of the northernmost group of the Færöe Islands. But he considers that the greatest error of those who adopt the "Færöe hypothesis" is to suppose that such a group of precipitous rocky islands separated by deep sounds, could possibly have been mistaken for, and represented as, a single large island, by so experienced a seaman as Zeno undoubtedly was. He agrees with Admiral Irminger that the "Frisland" of the Zeno map is Iceland, but he goes a step further than this, and brings forward elaborate arguments to show that Zeno's "Island" is also Iceland, quoting various instances in which a single country or island appears twice over, under slightly different names and outlines, in some of the old maps.

Professor Steenstrup then proceeds to give his reasons for agreeing with Herr F. Krarup (see R.G.S. 'Proceedings,' 1879, p. 152), that the "Frislanda" of the Zeno narrative is neither Iceland nor Færöe, but the modern "North Friesland" in the western part of the Duchy of Slesvig. "Frislanda," he observes, where a ship bound to England or Holland in the middle ages had been wrecked after driving about for days in fogs and storms, might be naturally looked for in some part of the long stretch of the coasts of Holland, Hanover, Holstein, and Slesvig, which belongs to the province of Friesland. Not only does the name "Frislanda" bear out this hypothesis, but the character of the country and people are in harmony with Zeno's description, while an historical personage as nearly corresponding to "Zichmni" as Earl Sinclair or the powerful Sigmund or Simon of Suderö, is to be found in Heinrich von Sighem or Sighme, the Marshal of Holstein.

* See *ante*, p. 372.

Professor Steenstrup goes on to deal with the discrepancies between the "Engronelant" of the Zeno map and the Greenland of the present day. After a careful comparison of the Zeno map and text, he comes to the conclusion that the "Engronelant" which has for centuries been accepted by geographers as a more or less faithful representation of Greenland, is nothing more than the "Eiderstedt" peninsula, and he brings forward a mass of evidence in support of this theory. He absolutely refuses to admit that the Zeni brothers ever went to Greenland, or that their voyage in the slightest degree affects the question of a pre-Columbian discovery of America, and he summarises his analysis of the whole subject into the five following conclusions:—

1. That the "Frisland" of the Zeni map is Iceland, and certainly not the Færöes.

2. That the "Frislanda" of the Zeni narrative is North Friesland, or "Strand" Friesland.

3. That the "Engronelant" of the Zeni map is certainly not Greenland, but a North-Frisian marsh-land, probably the "Eiderstedt" peninsula.

4. That the "Engronelant" of the Zeni narrative has nothing to do with Greenland, but, so far as the mosaic of the legend can be pieced together, is made up of reminiscences from Iceland and from the North Frisian marsh country, while nothing characteristic of Greenland is to be found in it.

5. That, consequently, the Zeni brothers never went to Greenland, and still less explored both the east and west coasts of that continent; and that all the assumptions that they had any knowledge of various parts of the coasts of America 150 years before Columbus are without foundation.

AUSTRALIA.

Bastian, A.—Zur Kenntniss Hawaii's. Nachträge und Ergänzungen zu den Inselgruppen in Oceanien. Berlin (Dümmler's Verlagsbuchhandlung, Harrwitz & Gossman): 1883, 8vo., pp. xvi. and 128. (*Williams & Norgate*: price 4*s*.)

Of ethnological and mythological interest exclusively. A plan of the Maori Mythology compiled by John White (Napier, New Zealand, 1878) is reproduced at the end.

GENERAL.

Avalle, E.—Notices sur les Colonies Anglaises. Paris (Berger-Levrault & Cie.): 1883, 8vo., pp. viii. & 696, map. (*Dulau*: price 10*s*.)

Commencing with geographical descriptions of the numerous British Colonies, this carefully compiled work proceeds to discuss their history, population, government, judicial, financial, commercial, industrial and other economic aspects individually; the author's aim being to give the French public a correct understanding of English possessions beyond the seas, and of their physical and political bases.

Ritter's geographisch-statistisches Lexikon uber die Erdtheile, Länder, Meere, Buchten, Häfen, Seen, Flüsse, Inseln, Gebirge, Staaten, Städte, Flecken, Dörfer, Weiler, Bäder, Bergwerke, Kanäle, Eisenbahnen, &c. Siebente Auflage, unter der Redaction von Dr. Heinrich Lagai. II. Sechszehnte (Schluss-) Lieferung. Leipzig (Wigand): 1883, 8vo. (*Dulau*: price 1*s*.)

This number completes the 7th edition of the standard work above named, occupying two large 8vo. volumes with 910 and 992 pages respectively, in double column of minute but very legible print, the cost of the whole work being 1*l*. 10*s*. The 6th edition was published in 1874, under the editorship of Dr. Otto Henne-Am Rhyn.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

Broichmann, J.—Erdkarte in Merkators Projektion. 8 Blätter. Metz, Lang. Price 10*s*. (*Dulau.*)

EUROPE.

Central-Europa, Neue Uebersichtskarte von——, resp. der oesterreichisch-ungarischen Monarchie. Scale 1:750,000 or 10·3 geographical miles to an inch. Herausgegeben vom k. k. militär-geograph. Institute, Wien. Lief. 3. Price 7*s*. 6*d*. (*Dulau.*)

Deutschen Reichs, Karte des——. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1883. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—150. Goldberg. 211. Dannenberg. 241. Havelberg. 242. Neu-Ruppin. 266. Stendal. 291. Burg a. d. Ihle. Price 1*s*. 6*d*. each. (*Dulau.*)

France.—Carte de France, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, Hachette et Cie., 1883. Sheets:—XIV.—12, Evreux. XV.—12, les Andelys; XV.—13, Mantes. XV.—14, Dreux. XXIII.—13, Commercy. XXIII.—14, Vaucouleurs. XXIV.—11, Thionville. XXIV.—12, Metz. Price 7*d*. each sheet. (*Dulau.*)

Ischia.—Carta topografica dell' isola——. Scale 1:20,000 or 3·6 inches to a geographical mile. Firenze. Price 1*s*. (*Dulau.*)

Mont Blanc, Le——, et la vallée de Chamonix. Carte de 1:80,000 or 1 geographical mile to an inch, d'après les cartes des Etats-majors italien, français et suisse. Chambéry. (*Dulau.*)

Nordsee-Küste, Uebersichts-Karte der——, von der Elbe bis zur Ems. Scale 1:400,000 or 5·5 geographical miles to an inch. Von L. Halenbeck. Bremen von Halem. Price 1*s*. (*Dulau.*)

Polen, Reymann'sche Karte von——, herausgegeben von Königl. Preuss. Gr. Generalstabe. Nachstehende 44 Sectionen der Reymann'schen Karte:—B, C, E, F, F 1, H, J, J 1, K, L, L 1, M, N, N 1, O, P, P 1, Q, R, R 1, 32, 33, 47, 48, 49, 63, 64, 65, 65*a*, 65*b*, 65*c*, 79, 80, 81, 81*a*, 81*b*, 81*c*, 96, 97, 98, 98*a*, 98*b*, 98*c*, 114, welche die russische Grenze von Memel bis Kalisch und den sich östlich anschliessenden Theil von Polen umfassen, sind soeben in ganz neuer Ausgabe und vorzüglicher Ausführung erschienen; der südliche Theil erscheint später. Price 1*s*. each sheet. (*Dulau.*)

Pyrénées Centrales, avec les grands massifs du versant espagnol, par Fr. Schrader. Scale 1:100,000 or 1·3 geographical miles to an inch. Gravé par Erhard, le modelé du terrain par l'auteur. With a pamphlet entitled 'Note sur la Carte des Pyrénées Centrales Françaises et Espagnoles.' Paris, 1883. (*Dulau.*)

The author of this map, M. Schrader, having in 1874 published, in 'l'Annuaire du Club Alpin Français,' a map of the environs of Mont-Perdu, on the scale of 1:40,000, and again in 1878 a map on the scale of 1:100,000 of the

same district, aided by a grant from the Minister of Public Instruction, undertook to extend his survey of the Central Pyrenees, and as the result of his operations has produced a map on six sheets on the scale of 1:100,000, comprising an area of 2442 square miles, extending in latitude from 42° 20′ N. to 42° 53′ N., and in longitude from 1° 10′ W. of Paris to 2° 40′ W. of the same meridian. The mountains are shown by a combination of hill-shading and contour lines 100 mètres apart. In his survey M. Schrader was partly assisted by MM. Albert and Léonce Lourde, professional engineers. A great portion, however, of the work seems to have been done by the author with an instrument of his own invention, which he calls the "Orographe," and which appears from the description given to be a modification of the plane-table. Only one sheet of this map has yet been published; another is nearly ready, and the author hopes to have the other four complete by the end of next year. The present sheet is beautifully engraved, and only contains such names as are necessary. The heights of all the principal peaks are given in mètres, but the contour lines are so distinctly marked that no difficulty would be found in determining the elevation of any other portion.

ASIA.

Indian Government Surveys:—

General Maps:—India 1882. Scale 127 miles to an inch. 9th edition.—Indian Atlas, Quarter Sheets. 8 N.E. Parts of District Dera Ghazi Khan, Bahawalpur (Native State). 31 S.W. Parts of Districts Sirsa and Bahawulpur (Native State). 31 S.W. Parts of Districts Sirsa and Bahawulpur (Native State, Punjab). Bickaneer (Native State, Rajputana Agency). 53 N.W. Parts of Bhopal, Gwalior (Sindhia), Indore (Holkar), and Dewas (Native States, Central India Agency). 66 S.W. Parts of Bijnor, Kumaun and British Garhwal. (N.W. Provinces). 4 miles to an inch.—**Bombay Presidency:**—Trigonometrical Branch, Survey of India: Guzerat. Sheet 17, Section 2. Seasons 1879–80 and 1880–81. Parts of Bulsár and Párdi Tálukás of the Surat Collectorate. 2 inches to a mile.—Guzerat. Section No. 7 of Sheet No. 49 (Dáng Forests). Parts of the Dáng Derbhavti, Dáng Shivbára, Dáng Gárvi and Dáng Kirli States. Seasons 1880–81 and 1881–2. 4 inches to a mile.—Guzerat. Section No. 15 of Sheet No. 49 (Dáng Forests). Parts of the Dáng Gárvi, Dáng Amála, Dáng Pimpládevi, Dáng Derbhavti, Dáng Avchar, and Dáng Chinchligadad States. Season 1881–82. 4 inches to a mile.—Deccan and Konkan Topographical Survey. Sheets No. 75 N.W., N.E., S.W., and S.E. (4 quarters). Poona Thana and Kolaba Districts, and Habsan and Bhor State. 2 inches to a mile. Seasons 1879–80–81. Sheet 18 N.W., N.E., S.W., and S.E. (4 quarters). Districts Poona, Thana, and Ahmednagar. 2 inches to a mile. Seasons 1877–78, and 79–80.—Konkan Topographical Survey. Sheet No. 84. Island of Bombay and District Thana. 1 mile to an inch. Season 1880–81. Sheet No. 85. Island of Bombay and Districts Thana and Kolaba. 1 mile to an inch. Season 1880–81.—Konkan Topographical Survey. Sheets 84 N. and 84 S. Island of Bombay and District Thana. 2 inches to a mile. Season 1880–81.—Khandesh and Bombay Native States Topographical Survey. Sheets Nos. 21, 23, 24, 34. Parts of Khandesh. 1 inch to a mile. Seasons 1878–82.—**Bengal Presidency:** Punjab Survey. Sheet No. 36. District Dera Ismail Khan. Seasons 1873–74 and 80–81. 1 inch to a mile.—Oudh Revenue Survey. Sheet No. 120. Districts Hardoi, Lucknow, and Unao. Season 1860–63. Sheet No. 154. District Partabgarh. Seasons 1859–61. 1 inch to a mile.—North-West Provinces Survey. Sheets Nos. 2 N.E. and S.E. District Saharanpur. 2 inches to a mile. Seasons 1878–79–80.—Gwalior and Central India Topographical Survey. Sheet No. 85. Parts of Oodeypore, Jodhpore and

Sirohee. No. 91. Part of Jodhpore. No. 92. Part of Jodhpore. No. 95. Parts of Jodhpore and Sirohee. 1 inch to a mile. Seasons 1880–81–82.—Bhopal and Malwa Topographical Survey. Sheet No. 51. Parts of Banswara, Partabgarh, Jaora, Gwalior, Rutlam, and Sailana. No. 53. Parts of Rutlam, Sailana, Banswara, Kusalgarh, and Khandu. 1 inch to a mile. Season 1881–82.—Rajputana Topographical Survey. Half Degree Sheet No. XIX. South. (Sheets Nos. 129, 130, 133, 134). Parts of Jeysulmere, Jodhpore, and Bickaneer. Half Degree Sheet No. XX. North. (Sheets Nos. 136, 139, and 140). Part of Jodhpore. Half Degree Sheet No. XX. South. (Sheets Nos. 137, 138, 141, 142). Part of Jodhpore. Season 1881–82. 1 inch to 2 miles.—The Presidency Division, comprising the Districts of 24 Parganás, Nadiyá, Jessor, Khúlna, and Múrshídabad under the Jurisdiction of the Lieut.-Governor of Bengal. 16 miles to an inch. Additions and corrections to 1883.—The Bardwán Division, comprising the Districts of Bardwán, Bírbhúm, Bankúrá, Húgli, Howrah, and Midnapúr under the Jurisdiction of the Lieut.-Governor of Bengal. 16 miles to an inch. Additions and corrections to 1883.—The Dacca Division, comprising the Districts of Maimansinh, Dacca, Faridpur, and Bakargay, under the Jurisdiction of the Lieut.-Governor of Bengal. 16 miles to an inch. Additions and corrections to 1883.—The Patna Division, comprising the Districts of Champáran, Sáran, Muzaffarpur, Darbhanga, Sháhábád, Patna, and Gayá, under the Jurisdiction of the Lieut.-Governor of Bengal. 16 miles to an inch. Corrections and additions to 1883.—Rájsháhi and Kuch-Behár Division, comprising the Districts of Dárjíling, Jalpaigurí, Kuch-Behár, Rangpur, Dinájpur, Bogra, Rájsháhi, and Pabná, under the Jurisdiction of the Lieut.-Governor of Bengal. 16 miles to an inch. Additions and corrections to 1883.—The Bhagalpur Division comprising the Districts of Monghyr, Bhágalpur, Purniah, Maldah, and Santal—Parganas under the Jurisdiction of the Lieut.-Governor of Bengal. 16 miles to an inch. Additions and corrections to 1883.—Khasi and Garo Hills Topographical Survey. Sheet Nos. 27 and 28 (second issue). Part of Cachar. 1 inch to 2 miles. Seasons 1867–69 and 1878–79.—Trigonometrical Branch, Survey of India. Jaunsár Báwar. 1 mile to an inch. Seasons 1874–75–76.—Shillong Sanatarium (Assam) Topographical Survey. 24 inches to 1 mile. Seasons 1878–81. Sheets Nos. 2, 3, 5, 6, 8, 9, 11, 12. Kohat City and Cantonment (Punjab). 12 inches to 1 mile. 1883.—Jaora and environs, Central India Agency. Season 1881–82. 6 inches to 1 mile. Bánswára and environs, Rajputana. 6 inches to a mile. 1883.—**Madras Presidency**:—Mysore Topographical Survey. 1 inch to a mile. Season 1881–82. Sheets 23 and 24. Parts of Kadur and Shimoga Districts.—**Trans-Frontier Surveys**:—North-East Frontier Topographical Survey. 1 inch to 2 miles. Sheets Nos. 51, 52, 53, and 55 (on one). Parts of Sylhet and Hill Tipperah. Seasons 1879 to 82. Sheets Nos. 86, 90, 91, 92, 93, 95, 96, 97. Parts of Burmah and Manipur. Seasons 1881–82.—North-East Frontier Topographical Survey. 2 inches to a mile. Sheets Nos. 2, 4, 5, 6, 8. Seasons 1877 to 82. Paris of South Sylhet.—Northern Afghanistan. 1 inch to a mile. Sheets Nos. 1, 2, 3, 4, 5, 6, 7. 1883. Sheet No. 8. 1 inch to 2 miles (2 parts). 1883.—Biluchistan Topographical Survey. Seasons 1880–81–82. Plan of Sibi, Biluchistan. 1 inch to 500 feet.—Turkestan and the Countries between the British and the Russian Dominions in Asia. 32 miles to an inch. 4 sheets. 6th edition. 1883. With Index.—**Indices**:—Index to the Sheets of the Garo, Khasi, and Naga Hills, and North-East Frontier Topographical Survey, on the scales of $\frac{1}{4}$ inch, $\frac{1}{2}$ inch, and 1 inch to a mile. 1883.—Index Chart to Surveys of Northern Afghanistan, published on 1 inch and $\frac{1}{2}$ inch scales. 1883.

Palestine.—Carte de la Palestine et du Liban, dressée par L. Thuillier. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Hachette, Paris. Price 8*s.* (*Dulau.*)

Siberia.—Carte de la Partie Méridionale de la Province Litorale de la Sibéria. Dressée en 1883 par Mr. Venukoff. Scale 1 : 2,500,000 or 34·4 geographical miles to an inch. Institut Géographique de Paris. Revue de Géographie, dirigée par Mr. L. Drapeyron. Librairie Ch. Delagrave, Paris. Sept. 1883. (*Dulau.*)

Tong-King.—Song Kai Delta (Tong-King). Scale 1 : 506,880 or 6·9 geographical miles to an inch. Lithographed at the Intelligence Branch, War Office, London. Sept. 1883.

On this map are shown enlarged plans of the towns and forts of Ha-Noi, Nin-Binh, Hué, Hai, Dzuong, and the citadel and town of Nam-Dinh.

AFRICA.

Tunisie.—Carte d'une reconnaissance dans la région centrale de la——, exécutée en 1882 et 1883 par M. Julien Poinsot. Scale 1 : 400,000 or 5·5 geographical miles to an inch. Paris. (*Dulau.*)

CHARTS.

Admiralty.—

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 493. South America, east coast:—Approaches to Monte Video. 2511. Tartary:—Strelok bay to St. Vladimir. 2347. Japan:—Nipon, Kiusiu, and Sikok island. 8*d*. Red sea:—Sheet 4. 8*e*. Red sea:—Sheet 5. 143. Red sea:—Jebel Teir to Perim island. 214. Pacific ocean:—Solomon islands. 1033. Australia, west coast:—Champion bay to cape Naturaliste. 1034. Australia, south coast:—Cape Naturaliste to King George sound and Doubtful island bay. 2149. Eastern archipelago:—Gaspar and Banka straits. 164. Red sea:—Musawwá channel. 2241. Baltic sea:—Entrance to the gulf of Finland. 2618. China:—Ke-lung harbour. 220. Newfoundland:—Savage cove to St. Barbe bay. 1128. Mediterranean, Sardinia:—Ports Conte and Alghero. 123. Africa, south coast:—Table bay breakwater and docks. 2397*a*. Scotland:—North and east coasts. 2154. England, south coast:—Newhaven. 358. Japan:—The western coasts of Kiusiu and Nipon. 104. China:—Korean archipelago, southern portion. 120. North sea:—Schelde river. 397. Africa, west coast:—Volta river. 1259. Korea:—Tsau-liang-hai or Chosan harbour. 1991. England, south coast:—Folkestone harbour. 2405. Japan:—Kuril islands. 1628. England, east coast:—Hartlepool bay. 2875. Japan:—Seto-uchi or Inland sea. 2682. England, west coast:—Nash point to New Passage. 518. Australia, west coat:—Shark bay. 1749. South America, east coast:—Monte Video to Buenos Ayres. 1720. England, east coast:—Filey bay. 2416. China sea:—Liu Kiu islands. 2160. Eastern archipelago:—Carimata strait. 292. Newfoundland:—Harbours and anchorages in the southern portion. 1628. England, east coast:—Hartlepool bay. 983. North Pacific:—Marshall islands. 987. South Pacific:—Plans of islands. 934. Eastern archipelago:—Sourabaya, Baly, and Sapoedie straits. 249. Africa, north coast:—Mehediah to Ras Makhabez. 2809. China:—Yang-tse-Kiang, Sheet IX., Shanghai to Nanking. 475. Australia:—North-west coast of Australia. 47. Hindostan, west coast:—Bate harbour. 1766. Africa,

north coast:—Cape Ferrat to cape Bougaroni. 2027. Prince Edward island:—Cascumpeque harbour. 675. Gulf of Aden:—Berbereh port. 285. Newfoundland:—Orange bay to Gander bay. 1938. South America, east coast; Uruguay river:—Martin Garcia to Salto Grande. 781. Pacific ocean:—North-west sheet. 783. Pacific ocean:—South-east sheet. 1602. China:—Entrance to the Yang-tse-Kiang. 2522. South America, east coast:—Santa Catharina to Rio de la Plata. 932. Java:—Plans of harbours and anchorages. 1942. Prince Edward island:—Bedeque harbour. 2234. Black sea:—Sea of Azov. 1811. Africa, east coast:—Chala point to Kwyhoo bay. 771. Liu Kiu islands:—Haucock bay. 1461. Italy, west coast:—Genoa. 1358. South America, east coast:—Union bay to Rio Negro. 214. South Pacific ocean:—Solomon islands. 1670*b*. Australia, east coast:—Moreton bay. 1674. Australia, east coast:—Brisbane river. 545. South America:—Anchorages in Magellan strait. 1413. England, west coast:—Holyhead bay. 1411. England west coast:—New Quay to Holyhead. 814. Bay of Bengal:—The Sandheads. False point to Mutlah river. (*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—No. 3916. Côte Nord de France. De Gravelines à Zuidcoote. Atterrages de Dunkerque, 1882.—No. 3891. Côte Nord de France. Du Cap Gris-Nez à Calais. Atterrages de Calais, 1882.—No. 3932. Plan des Environs de Trouville, 1883.—No. 3913. Côte Nord de France. Rade de Dunkerque, 1882.—No. 3915. Mer des Indes. Golfe d'Aden. Port d'Obock, 1882.—No. 3925. Golfe du Tong-Kin. Côte Sud de Chine. Entrée de la Rivière de Long-Moun, 1882.—No. 3857. Mer de Chine. Côte d'Hainan. Mouillage de Nankin. Mouillage de Tinhosa, 1881.—No. 3936. Golfe du Tong-Kin. Mouillages de Shieng-Moun, Kouai-Sing-Moun et Ke-Bao, 1882.—No. 3938. Tunisie. Lac de Bizerte (Partie Nord), 1883.—No. 3930. Océan Pacifique. Iles Marquises. Ile Ua-Huka, 1883.—No. 3894. Nouvelle Calédonie. Côte Est. Baie de Tuo, 1882. Dépôt des Cartes et Plans de la Marine, Paris.

United States Hydrographic Office.—Chart No. 903. North Pacific Ocean. West Coast of North America from the Juan de Fuca Strait to Queen Charlotte Islands, including Vancouver Island; from British and United States Surveys to 1882. Published June 1883 at the Hydrographic Office, Washington D.C. J. C. P. de Krafft, Commodore U.S.N., Hydrographer to the Bureau of Navigation. Price 2*s*. 1*d*.

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This atlas is divided into three sections, each of which may be had separately: Sec. I. 12 maps, 8*s*. Sec. II. 18 maps, 10*s*. Sec. III. 23 maps, 12*s*. 6*d*.

The contents are as follows:—

Sec. I.: La France et ses Colonies. 1. France hypsométrique. 2. France physique. 3. Bassin de la Gironde. 4. Bassin de la Loire. 5. Bassin de la Seine. 6. Bassin du Rhin français. 7. Bassin du Rhône. 8. France historique. 9. France administrative. 10. Voies de communication. 11. Algérie. 12. Colonies.

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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Survey of the Eastern Coast of Lake Nyassa, and latest news of the "Lake-Junction Road." By James Stewart, C.E.

Map, p. 752.

The following letter and its accompanying map acquire additional and melancholy interest from the recent telegraphic news of the death of the author, which event occurred on the 30th of August, barely a month after the date of his postscript. Besides his great services in founding suitable stations for missionary work on the lake, and in constructing, on behalf of Mr. James Stevenson, the road between the two lakes, he has added, during the years he has been engaged on Nyassa, greatly to our geographical knowledge of the lake and the surrounding country. The survey of the eastern coast, which he sent with this, his last, communication to Mr. Stevenson, enables us to complete the whole outline of the lake, part of which was left blank in his previous maps, published in the 'Proceedings' for 1879, p. 352, and 1880, p, 464.

My dear Mr. Stevenson,— Karonga, Lake Nyassa, *2nd July*, 1883.

It is some time now since I last wrote to you, but I have had very little to write about. The work of the road is slowly progressing, but a great deal more slowly than I would like. At the present there are about 100 men engaged on it. Munro has just finished the very difficult portion along the bank of the Kikuru river at Karamba, so that perhaps the most serious obstacle on the whole road has been overcome. I have just now come down from Maliwanda's to lay out another bit of work for him. The chief keeps on very good terms with his men, and they always keep saying that they are going to finish the next 12 miles for him. Karamba also continues friendly, and, what is even stranger, the Arab visitors in the district are now well-disposed, and have been selling Munro supplies (fowls, &c.), and they have also been selling ivory to Monteith at the lake. At Maliwanda, only about 10 miles have been done this season. I cannot yet make out why they won't come out to the work. In every other respect we are on good terms with them. I left Ross last week with a gang of forty-two, some of whom had come from a considerable distance.

That number should do about a mile a week, as the work is very easy up there. Last week I paid a visit to Mivini Wiwa, and was rather disappointed with him. He certainly is a chief of much greater power than Maliwanda or any other near here, but he maintains a kind of barbarous regal state about him, the idea of which he can have received only from Arabs. Indeed I heard that he was both fond of war and of trading in slaves. He generally makes incursions into the region about the Loangwa, to the south of the chief Kambomba. When I was introduced to him, I was stopped at a considerable distance from him, say 25 yards, and sat down, and thereafter his head men acted the part of spokesmen between us, and took him my present, which he received civilly. But in fact I was rather taken aback at his greatness and magnificence, and was not prepared with a suitable present (I had only brought a blanket such as Maliwanda would have been proud to receive). I intend to send him another present; he is much too far away to visit again, at least just now. His village is very nearly 100 miles south-west of Maliwanda, and therefore considerably to the south of the line of road, which I am not sorry for. He is old, and evidently an acute man of business, so I think he may be trusted to act according to his interests, which certainly are to keep on friendly terms with the white men, as his constant enemies, the Awemba, are always troubling him. If I had been the fortunate possessor of war medicine, I could on the spot have made a firm friend of him. His people have a large number of good flint-locks.

A Frenchman with a strong party from Zanzibar* lately passed through the district. He had some trouble with Maliwanda about food, and did not leave a very good name there. He then went to Mivini Wiwa, and, I heard, purchased or accepted two slaves from him. It is a great pity that European travellers should soil their hands by touching this accursed traffic. The acceptance of slaves, even as a matter of courtesy, is really trading for them, and is considered as such here. Mivini Wiwa sent me a boy along with the bull some months ago, but of course I sent him back. The Frenchman was said to be travelling to Tanganyika; but I have no certain information regarding him. He visited my house at Maliwanda in my absence, but did not leave his card or any message. On my way to Mivini Wiwa I crossed within two days' march the head-waters first of the Longwe, draining to Lake Nyassa; then of the Loangwa, draining to the Zambesi; then of the Chambezi, draining to the Congo. All these streams rise in the Mapurumuka Mountains, at the south end of the Awiwa range. The Chambezi tributaries are large, and from the point where they unite must form a considerable stream; but the altitude at which I crossed

* No doubt M. Giraud, on his way to Lake Bangweolo and the Congo. He left Dar-es-Salaam, near Zanzibar, on the 10th of December, 1882. He was last heard of about April last, from Mguna, in Khutu, S. lat. 7° 27′.—[Ed.]

them forbids the idea of any navigation. At 40 or 50 miles west of Maliwanda the elevation is 4622 feet above the sea, or 934 feet above Bangweolo. As far as I went the country continues quite level, with abrupt hills here and there, which the native tracks of course avoid. The first consignment of the London Missionary Society's steamer for embarkation on Lake Tanganyika is now safe at Maliwanda. The last plates were carried up by Karonga's men; so if they will carry the loads henceforward to Maliwanda, I have little doubt that Maliwanda's people will carry them on the next stage. They have come down several times for loads. We are now in daily expectation of the *Ilala* with the second consignment.

I send you at last my survey of the east coast of Lake Nyassa. I have no report to make about it. The coast country is very sparsely populated. At Chitisi, the Losewa, and at Makanjira, there are a good many villages; elsewhere the coast is either rock-bound or marshy. The large river I formerly mentioned throws up a shallow bar, except when it is in flood, which is quite impassable except in the rains; the discovery therefore ceases to be of any importance. Bampa Harbour turns out to be one of the best on the lake, and has been used a good deal lately by the *Ilala*. Inland from it is a fairly good elephant shooting ground. Lieutenant Pulley is there just now, shooting for the Company. This place will likely become more familiar to us soon. Mr. Johnson, of the Universities' Mission, is now travelling among the Makangwara tribes, east of the Livingstone range, and intended to return to Bampa. His report will likely be of interest. This leaves us all well at present. With best regards,

Yours, &c.,

Jas. Stewart.

P.S.—I have just received through Consul O'Neill a copy of your letter to Her Majesty's Secretary for Foreign Affairs. I will rejoice greatly if any Government action can be looked for. Much pressure is still required at Zanzibar, but how influence can be made effective in the interior is a more difficult problem. You have, doubtless, considered all the bearings of the matter. I would only point out that it would be a bad business for us here if energetic measures for the suppression of the slave trade were taken in the north of Africa and nothing done here, as then we should likely be overrun by traders. I think that at least an annual round by the lakes from Quillimane to Ujiji, and thence to Zanzibar, might be made by such a man as Consul O'Neill with very good effect. Acquaintance with the British power would do much good, and would give us greatly increased confidence.

Blantyre, 1*st August*, 1883.

The sad death of Captain Gowans of the *Ilala*, at Karonga, on the 15th of July, imposed on me the duty of bringing the *Ilala* down to

Matope, and consequently of leaving my proper work for a time. I arrived here on the 30th of July, and heard of the death of Mrs. Duncan and Mrs. Nichol of Blantyre. They will be much missed. Before we left Karonga, Monteith had forwarded nearly the whole of the second consignment of the London Missionary Society's steamer on to Maliwanda, so I trust there will be no delay there. Mr. Filloir and Mr. Roxburgh go north with me as soon as we can get ready, and they will look after the transport.

J. S.

The River Congo, from its Mouth to Bólóbó; with Notes on the Physical Geography, Natural History, Resources, and Political Aspect of the Congo Basin. By H. H. Johnston.

(Read at the Evening Meeting, November 12th, 1883.)

Map, p. 752.

Shortly after my return from the Congo in the month of August last, I was invited to read before the Geographical Section of the British Association a short account of my personal experiences during my journey. This paper has already been published in the October 'Proceedings' of the Royal Geographical Society, and it may be regarded as a prelude to the further and more detailed description of this country which I have now the honour to lay before you.

On starting to reach the Congo, as I did, from São Paulo de Loanda, journeying along the hundred and fifty miles of coast that separate the mouth of that river from the capital of Angola, you must necessarily pass rather varied phases of African scenery. Between Loanda and Ambriz, strange to say, although the country is nominally owned by the Portuguese, it is almost impossible for a European to travel by land, owing to the animosity of the natives, but save for the pretty river Dande there is little to be seen of much interest. Ambriz itself is a remarkably ugly place, but possesses great materials for prosperity as it has been made a fairly safe landing-place by the Portuguese, in the midst of a singularly dangerous coast, and is moreover the great outlet for the coffee trade of the interior. A few miles north of Ambriz recognised Portuguese dominion ceases, the river Loge being the boundary, and the next European settlement, Kinsembo, is independent and cosmopolitan. The scenery, where no river-course intersects the land, is depressing, the chief vegetation that spots the arid soil being ugly euphorbias and stunted baobabs, except along the sea-coast, where an occasional Borassus palm gives a promise of better things. Some ten miles off in the interior the landscapes are so many earthly paradises, with their massive groves and verdant slopes and prosperous plantations, but here near the

sea it is barren, grey, desolate and deserted, like so much of the South-west African coast. So on, past Musséra and other trading settlements until Ambrizete is reached. Here there is something more hopefully alive in nature. The scenery at about a mile from the coast is beautiful and park-like, and the meadows down near the Ambrizete river are studded with many wild flowers. The baobabs in the distance seem to be fine stout beech trees, growing in an English park, and their leaves are tender and green, having just budded out under the October rains. Even the euphorbias are handsomer and glossier in this more favoured region, and have lost that dingy colour and distorted form which characterise them on the arid Angolan coast.

As Ambriz is the great coffee port, so Ambrizete is the outlet for the ivory trade, and has been so for many years. As I shall point out farther on, the ivory road starts from Stanley Pool, passes through São Salvador and debouches at Ambrizete. From Ambrizete the pine-apple has been introduced along the trade routes, far into the interior of the southern Congo region, and it is probable that limes and oranges, maize and sugar-cane originally started from here or from some neighbouring point along the coast, where they were introduced by the Portuguese, and spread thence rapidly into the interior along the arterial trade paths, finding it easy to overrun these hitherto poorly-fed countries. The natives of Ambrizete are very turbulent and decidedly opposed to any idea of future annexation or protectorate by a European power. For this reason no white man is allowed to penetrate more than a few miles into the interior, and scientific explorations are indistinguishable in their eyes from political reconnaissances. In this way the region lying between São Salvador and the coast, vaguely named Ngoje, remains almost unknown to Europeans.

Beyond Ambrizete are many smaller settlements for trade, the last of which, before the Congo is reached, being Cabeça da Cobra, in the country of Sonyo, a region once subjected to considerable Portuguese influence. This little place seemed to my starved eyes a marvel of tropical scenery, for here after many hundred miles of desert or arid plateau the sterile influences of the south coast are vanquished, and a rich, beautiful vegetation grows down to the very waves. There was a stretch of low-lying land about a mile or less in breadth immediately next the sea, which was overgrown with dense bush, and was in fact a most beautiful natural garden. There were groups of umbrageous trees (some of them handsome species of papilionaceæ, whose lilac-coloured blossoms covered the ground beneath) offering a most welcome and unaccustomed shade, where seated amidst a trellis-work of creepers, on a dry carpet of fallen leaves and flowers, you could dreamily inhale the perfume which the ardent sun drew from the surrounding jasmine bushes. In the background, behind all this greenery, the land abruptly

rises and resembles a row of ancient cliffs, from which the sea has retreated, and whence the rain has washed down the loose surface soil that nourishes the verdant garden below. Their summits are harsh and barren from the constant denudation, but half a mile farther on vegetation begins again.

The natives in the neighbourhood of Cabeça da Cobra are of rather a low type and very black; they belong to the Mushirongos, a tribe which reaches to the south bank of the Congo. The interior of their country is but little known.

Some time before we reach the Congo, the red cliffs which are such a constant feature in the South-west African coast sink lower and lower, and give place to mighty mangrove swamps of considerable extent. Then the sea becomes coloured by the sediment of the river, and the contrast is sharply marked where the cloudy river-water meets the clear sea. The colour of the Congo water is dark brownish-red, and that of the sea transparent green; the temperature of the two waters is also different, that of the Congo registering 83° Fahrenheit, and the sea-water 74°, a difference of nine degrees.

The mouth of the Congo is comparatively unimposing for so great a river, and is very simple and undivided when compared with the great deltas of the Nile, the Niger, and the Zambesi. In fact this is one of the first impressions which gives an air of "newness" to the river, and suggests that its present outlet into the Atlantic Ocean may not be of very ancient date. That the Congo in many directions is trying to force its way to the sea by means of other branches, I am inclined to believe, for many of its so-called "creeks" between Boma and the sea, though at present remaining blind alleys, yet have gained in length in the memory of the European settlers on the Lower Congo, and it is the opinion of some who know the country that the river may ultimately force a way to the sea at Kabinda by means of a branch outlet from Boma.

The aspect of the mouth of the Congo with its two opposite points of Padrão and Banana is rather curious. They seem like the last fragments of the ancient coast-line through which the river has broken. Point Padrão is a spit of marshy land covered with splendid forest and fringed with breakwaters of mangrove and clumps of beautiful Borassus palms. Banana Point is a little peninsula of sand which without the intervention of man would have been washed away by the river current on one side and the waves of the Atlantic on the other. On this narrow strip of land where space is as valuable as in some civilised cities, there are three different factories, of which that belonging to the Dutch Company is by far the largest and most important. On the ground occupied by this establishment many handsome palms are planted, to aid with their roots in keeping the loose soil together. Where the peninsula is joined to the mainland it is all over-

grown with giant mangroves and is very marshy in character, being to all intents and purposes an island, for it is impossible to reach the high ground beyond otherwise than by water. On the inner side of the little promontory is a deep and capacious inlet of the Congo, where there is room for a whole navy to be moored. Here ships of the greatest size can be anchored within fifty yards of the shore.

Beyond Banana, northwards, following the coast-line, there is a great stretch of mangrove, and then the land again begins to rise into low red cliffs at Muanda, where there is a trading station. Thence the road leads on to Vista, another settlement of Europeans, where there is an excellent and healthy climate, and where immense herds of oxen are bred for the sustenance of the whites on the Lower Congo. Beyond Vista the path or native road goes on to Kabinda, Landana and Loango, and there is a regular system of human porterage from village to village. Indeed, at the time of my first visit to Banana in November 1882, I was informed that it was perfectly easy and safe to go alone in a hammock with native carriers from Banana to the mouth of the Ogowé, along the coast, and the journey could be accomplished at a moderate expense. I had very nearly settled to undertake this interesting trip, and nothing but the arrival of Mr. Stanley diverted me.

Since then, however, owing to the arbitrary proceedings of the French along the Loango coast, the road has been temporarily closed.

Before I proceed further in my description of the Congo, I should like to say a few words on the physical aspect of South-west Africa, which offers certain peculiarities that have not, as far as I know, been sufficiently insisted on by African geographers, and which will necessarily be referred to in my continued account of the different phases of scenery along the lower course of the Congo.

Throughout the western coast of tropical Africa, from Sierra Leone to the river Ogowé, the one prevailing landscape is that of endless forest. This is, in fact, part of the forest region—the forest belt which has a distinctive fauna and flora, and which extends eastwards, near the equator, more than half-way across Africa, to Lake Victoria Nyanza and the western shores of Tanganyika. This is the country of the anthropoid apes, which are found equally near Sierra Leone and on the Wellé and near the Upper Nile. But when the mouth of the Ogowé is passed, the forest begins to retreat from the coast and is gradually succeeded by more open savannah scenery, so characteristic of Africa, and so happily described by older travellers as "park-like," a designation which its open grassy spaces and formal groups of shady trees amply justify. Such is the country at Loango, Kabinda, and along the Lower Congo up to Stanley Pool. But a little to the south of the Congo embouchure the park-like scenery in its turn begins to retreat from the coast somewhere about Cabeça da Cobra, a place I have already mentioned, and there follows a much uglier region of sparse vegetation and less abundant

rainfall. Of such is the country around Loanda, where scarcely anything but euphorbias, baobabs, and aloes are growing, and where there is often less than two months' rain in the year.

This harsh country continues along the coast for some distance until about the 13th parallel, where it in its turn trends off towards the interior, and absolute desert takes its place and continues uninterruptedly as far as the Orange River. In a journey from Mossamedes to the river Cunéné, such as I have recently made with Lord Mayo, you may successively pass through these three last phases of scenery, and after crossing a zone of absolute desert, enter a region of sparse vegetation, and finally arrive at the beautiful undulating country of scattered forest and grassy plains which only reaches the sea as far north as the Congo mouth.

This sterility seems to be a continuation along the south-western coast of the Kalahari Desert, and it is curious that something similar takes place in Western South America, where the desert would appear to be prolonged northwards in a narrowing belt, and also in Western Australia—a contrast to the fertility and abundant vegetation of Brazil, Queensland, and South-east Africa.

The four regions I have just described may be said to vary from almost absolute sterility to transcendent richness of vegetation. Perhaps the word sterility is hardly a true one, as the desert soil is quite capable of producing ample crops; it is merely the rainfall that is lacking. The sandy wastes between Mossamedes and the Orange River grow little but the strange Welwitschia and a few stunted Bauhinias; in the succeeding region the euphorbias and aloes are the principal occupants of the soil, with an occasional baobab, mimosa, or fig. In the park-like country the forest trees are too numerous and varied to catalogue; but amongst them may be noticed the beautiful Hyphæne palm, the oil-palm as far as 10° S., the cotton-wood, the baobab, gigantic mimosas, figs, and a variety of splendid trees belonging to the papilionaceous order. This is the most typical region of Africa, and it is the country of the large game animals. Finally, the forest belt that clothes so much of Western Africa is the grand climax of vegetable development, where with ample space, continual rain, and an equatorial sun, plant life flourishes and rules supreme above the animal world.

The first place on the Congo at which I made a protracted stay was Kissangué, a semi-Portuguese trading settlement on the south bank, about 21 to 23 miles from the sea. This was a singularly interesting district, and, in spite of its marshy character, very healthy. The mangroves still grew here, but were no longer the principal occupants of the watery soil. Away from the temporary and feeble clearings that the few commercial houses had made, a majestic forest towered into the sky, displaying the most splendid effects that a rich and fantastic foliage, a brilliant colouring of varied greens, and a weird architecture of contorted and massive trunks could produce. In the marshy spots

down near the river's bank were masses of that fine orchid, *Lissochilus giganteus*, a terrestrial species that shoots up often to the height of six feet from the ground, bearing a head of glorious red, mauve, golden-centred blossoms scarcely to be equalled for beauty and delicacy of form.

Kissangué is very nearly an island, being encircled by two arms of the Congo, which only dry up occasionally in the dry season. On the mainland, where the land is really firm, more game is present than on the islands and marshy banks of the river.

The next settlement of any importance is Ponta da Lenha, where steamers call for supplies of wood fuel. Ponta da Lenha, 40 miles from the sea, and just out of the district of the mangrove swamps, offers little of interest or note save its fine orange-trees, the only ones to be found on the river. This place is barely above the level of the stream and the shore has to be protected with piles, as the Congo, continually widening its bed, is slowly eating Ponta da Lenha away. Towards Boma the hills begin to approach the river and the character of the country becomes sensibly altered. The vegetation is no longer so luxuriant, and the highlands are destitute of trees and covered with long grass, owing to the periodical bush fires. Advancing from Boma the valley of the Congo gradually but rapidly narrows and the character of the country becomes harsher and bolder. At Mussuca the Borassus palms, so graceful an addition to the landscape, begin to disappear, the forest is relegated to the narrow ravines, and the hills, scarped and bare, rise higher and higher above the straitened stream. As we approach Vivi we pass an extraordinary gorge called Hell's Cauldron where the Congo boils and seethes at the base of the red cliffs, and the little river steamers find it hard to force their way up through the many whirlpools. Around Vivi the landscapes are rather imposing. The mountain-sides are bare but grandly shaped, and in the winding ravines there is rich forest. Opposite Vivi, the Mpósó river which flows from the direction of São Salvador, enters the Congo, and a little beyond it is the last fall of the Congo, a short distance below the celebrated rapids of Yellálá, which as the crow flies are about nine miles from Vivi, though the native road makes the distance somewhat longer. The wild hills round this tortuous part of the river's course are almost destitute of trees and are generally sparsely covered with coarse grass. Large intrusive blocks of gneiss often lie scattered in the valleys, possibly washed down there by the heavy rains, which must rapidly modify the surface of this country, to judge by the effect one thunderstorm can produce in furrowing the hill-sides with temporary watercourses. The journey up the irregular native path which leads to the stony height overhanging the Yellálá Falls is very fatiguing, for the rocks are disposed in ascents which are almost stair-like, more resembling perhaps the sides of the Pyramids, each step being often three feet high. As, however, you round the hillside, a sudden turn in the path brings a grand scene into view and a deafening

roar of falling water. From a projecting slab I looked down some hundred feet on the giant Congo, leaping over the rocks and dashing itself against the imprisoning hills. Several islands bestrewed its stream, one especially remarkable from being a mass of velvety woods. This was called the Isle of Pelicans, for numbers of these great birds used this inaccessible spot as a breeding place. Before the first fall occurred the river came gliding on smoothly, with a glassy surface, and when it first met the rocks it streamed over them almost unresistingly until, as if exasperated by repeated checks, in the last grand fall of Yellálá it lashed itself into white and roaring fury, and the sound of its anger deafened one's ears and the sight of its foam dazzled the eyes. In all probability the Congo never descends here more than 12 feet at a time, but the constant succession of falls and the obstructing rocks lash the water into a state of indescribable fury. It is a race of waves; some seem to outstrip the others, and every now and then, the water rebounding from the descent meets the oncoming mass, and their contact sends a sheet of foam and clouds of spray into the air. The rocks near the water's edge are covered with a long filamentous water-weed of intense verdure, and looking like long, green hair. White plumbago and many bright flowers are growing in the interstices of the grey rocks, over which large blue and red lizards chase the flies that are half stupidly basking in the sun. At the greatest fall of Yellálá, the river is divided by a great fragment of hill separated from its mother-mountain by one half of the stream, and farther up more masses of rock in which the white gneiss crops out abruptly, intersect the river. On the hillsides also many bits of porphyry and gneiss jut out from the red clayey soil. The forest is hidden in the deep ravines, and only small bushes occasionally appear amid the rank grass that covers everything. The background is a strange wild jumble of hills, and the heavy rains have scooped and furrowed their friable soil into clefts and ravines and hollows, in which the dark forest hides from the constantly recurring bush fires that sweep over the country when the grass is dry.

The scenery between Vivi and Isangila is very varied and often beautiful. It is mountainous, but not so harsh and unclothed as around Yellálá, while the valleys are filled with splendid forest; and some of the ravines through which the streams tumble in white cascades over the blue-grey rocks, spanned by the creepers which stretch from palm to palm, are richly varied in effect. In broader valleys, such as that of the river Lulu, the forest is magnificent; and the glades are carpeted with mosses and silvery lycopodiums, through which the little track or foot-wide path meanders. Much animal life is evident here. At almost every turning the path introduces you brusquely to a family of monkeys, who have descended from the tree-tops to feed on the small ground-growing berries, or to plunge their greedy, wasteful fingers into the crimson pulp of the straying gourds. They bound up into the trees

on your approach, taking refuge on large platforms and nests of twigs which they seem to have constructed on the upper branches. The green fruit-pigeons startle you in the trees with their strange cry, commencing with a whirring noise, two or three clucks, and ending up with a sweet and prolonged coo. The bee-eaters are swooping in eccentric circles on the many flying insects, and little hornbills sit in staid immobility on bare and exposed branches.

The rapids of Ngoma are the next important falls of the river above Yellálá, and the scenery is very fine about here. At Isangila, however, are probably the most picturesque falls to be seen on the Congo—if "falls" be the best term to express what are after all scarcely more than immense rapids, for the Congo never descends in vertical cascades. On the south bank, nearly fronting Isangila station, is a lofty cliff—a hillside cloven in twain, its scarped sides of a purple-red colour; but its sombre look is relieved by the bright green grass that clothes the little knolls and irregularities varying its sheer descent towards the Congo, and the graceful crown of forest, which lends a pretty finish to its somewhat gaunt head. At its base, the river which has hitherto been gliding onwards with deceitful smoothness, suddenly breaks into white foam, but only that part of it near the base of this cliff; the other half of the great river goes rolling on, smooth and unruffled, till at length the whole stream takes one great bound over some hidden ledge of rocks, and the mass of this mighty current is lashed and churned into a terrible conflict of waves. From the constant come and recoil of the masses of water rise tall columns of spray, descending in glittering drops on the tree-clad islands, and forming under the sun's rays fitful gleams of rainbow colours which seem at first hallucinations of the eye. Below this great Isangila Fall, the river breaks away into many little bays of quiet water. At this spot, the river Lulu, coming from great distance to the southwards, joins the Congo.

From Isangila, which I may mention was the last point reached by members of Captain Tuckey's expedition, who call it "Sangala," to Manyanga there is a stretch of river about 80 miles in length sufficiently free of serious obstacles to be navigated even by rowing-boats, although when going up stream these have at times to be dragged up the rapids with ropes from the shore. The scenery along this part of the Congo is at first very pretty. For some distance past Isangila the banks are richly forested, and masses of creepers overspread the river-side trees. Here and there, especially about the rapids, the Congo is strewn with rocky islets, sparsely crested with trees; and in and out of these the stream whirls and eddies over the hidden rocks, making many formidable whirlpools, in which great flecks of foam, like balls of cotton-wool, are dancing madly in a perpetual round. In the broader parts (and its breadth here is nearly a mile) groups of trees stand in the very middle of the river, stemming its rapid flood. They must mark the sites of rocks

and banks uncovered in the dry season, or, more probably, of newly submerged islands, for otherwise the seedling tree could hardly have obtained sufficient growth in one dry season to withstand the river's flood.

Some distance beyond the Livingstone Falls, which are not very striking, the Congo broadens greatly, but nearing Manyanga, the scenery of the river becomes commonplace. Low hills of magenta-coloured earth, streaked and spotted with dull yellow-green and fringed at their bases with scanty forest, border the great watercourse. Beyond Manyanga, however, high hills approach the Congo, and once more confine its turbulent stream within narrow limits. The great falls of Ntombo Mataka here take place and offer the nearest approach to a cascade that this river exhibits. The two lines of dazzling white that seem like two successive "steps" of water may be seen from a great distance on the surrounding hills. The backwater that is here made by the current is very dangerous, as a boat crossing the river from Manyanga may easily be drawn into it and carried up stream to be whirled suddenly into the cataract.

There are two roads hence to Stanley Pool between which to choose (for you can no longer follow the river by water), one on the north and one on the south bank of the Congo. That on the south bank is usually preferred as being shorter and leading through pleasanter country. From the high plateaux beyond Lutété, a large native village near the Ntombo Mataka Falls, a fine view may be obtained of the Edwin-Arnold river, as it comes leaping in tremendous cascades into the Congo. The waters of this stream look exactly like a white cloth laid at intervals over the purple-wooded hills, for the distance at which you are standing does not permit you to see the motion of its water, and the sheet of white spray is apparently as still as if photographed. The trade route, one of the great ivory roads to the coast, which we follow from Lutété to Stanley Pool, is strewn with the top leaves of pineapples which, when the fruit is eaten, are thrown away, and taking root in the rich red soil at the side of the path, serve to spread this plant along the whole route between Stanley Pool and the coast, in some places, especially in the moist ravines, forming an almost impenetrable hedge on each side of the narrow path. The inhabitants come to these valleys and fill their long wicker baskets with the fruit, which now forms so large a part of their diet.

The country between Lutété and Stanley Pool presents many beautiful landscapes. A great stretch of valley, filled with rich forest, with a sounding stream that is seen flashing through the trees, is bounded by boldly-shaped hills, between each of which lesser valleys lie, that seem, as it were, tributaries of the great one, some of them mere crevasses in the mountains, but each with its tiny stream, its cascades, and its velvety woods. Occasionally, especially near

Lutété, patches are cleared in the valleys, and the rich soil which the rain is always washing down from the hills is planted with manioc, tobacco, ground-nuts, and bananas. This gives at times a civilised look to the country, and suggests the idea that in the future, when colonists flock to occupy the Congo territories, these lowlands will become fertile valleys, bringing forth the products of the tropics; while their hill-sides, terraced and planted with vines, will be surmounted with many a fine-built habitation. The rounded hills that encircle these luxuriant valleys are covered with strong coarse grasses of several sorts, of which the flower-stalks often attain the height of 12 to 15 feet, and with gnarled and stunted trees, bearing leaden-coloured, almost uneatable fruit—I should omit the qualifying "almost" were it not that I have seen the natives occasionally gnawing them. These trees are spread sparsely over the hillsides, and give them from a distance a spotted appearance. This difference in richness of vegetation that exists between hills and valleys in this part of Africa is not due so much to the relative abundance of moisture as to the prevailing grass fires in the dry season. These sweep over the hills, at times, destroying all the finer trees, so that only these stunted shrubs and the rank grass spring up from their roots anew and flourish for a season. Therefore it is that around the villages whose plantations are protected from the ravages of the flames, as far as may be possible, rich forest invariably exists. Again, in all shut-in valleys and river-courses where the fires are choked, there vegetation of the most wonderful character riots in all the wild luxuriance of its unchecked growth.

About noon on the third day after leaving Lutété, I came to the banks of the Inkissi, and had to cross that swift, rolling, turbid stream in native canoes. The natives always land much lower down the river than the place where they embark, for the current is so swift that it is impossible to entirely withstand its influence. It is here about as wide as the Thames at Windsor.

Some little distance before Stanley Pool is reached, there is a smaller widening of the Congo with two or three large islands in the centre, and where the river has three successive falls, called by the natives the Father, Mother, and Child. They are called the "Itsi" Cataracts on some maps. "Itsi" is only one of the many words in the Congo dialect for a rapid or fall, and in these tongues there are terms to express most of the effects of falling or troubled water. Ngoma, Ntombo, Yellálá, are all descriptive names, and one word, Mpūto, which really means troubled water, is often for that reason applied to the sea, and in a more abstract sense to those who come from the sea, viz. the Europeans. The old term Mwéné Mputǫ applied by the natives of the interior to the great chief of all white men, does not, as the Portuguese would have us believe, mean the King of Portugal, but literally "child of the sea."

The great expansion of the Congo at Stanley Pool I have already

treated of in my former paper, so I will not repeat here a detailed description of this beautiful lake, with its forest-clad islands, its placid waters, and its wooded cliffs. Although the north-eastern end is shut in by high hills, the mountains do not encircle the expanse of water but retreat from it on both sides, and the level plains that stretch away for some miles to the south of Stanley Pool at but a few feet above the water, give one the idea that it is somewhat shrunken in extent.

On ascending the Congo higher than Stanley Pool, the scenery becomes very much more tropical than amid the rather denuded, rocky country of the cataracts. We are now entering the forest region, and the vegetation has attained a greater richness and development and variety of forms than below the Pool. Many new species of plants, new trees, new palms, make their appearance, together with birds and butterflies of the forest country. The banks continue to be high, and are densely wooded, but often the river is closely shut in, and although the region of the cataracts may be said to be past, or, in descending the river, not yet begun, still there are occasional rapids and scattered rocks that suggest the fact that there were once cataracts above Stanley Pool. The current in the centre of the river is so strong and so beset with whirlpools as to be dangerous to native canoes or small boats. A few islands occasionally stud the stream, one of them, Flamini Island, being covered with nearly 2000 Hyphæne palms; but as a rule the course of the river is pretty clear and its breadth an average 1000 yards until after the confluence of the Wabuma-Kwango. Both this latter river and the Alima have their outlets much impeded by sandbanks. The upper course of the Wabuma much resembles the Congo. It flows out of Lake Leopold II., then broadens out greatly in a flat country of dense forest, and is covered with many islands. It narrows again where it receives the great Kwango from Angola, and the embouchure of these two great rivers united is somewhat insignificant. Their waters flow for some time side by side without mingling with those of the Congo. Some distance before Bólóbó is reached, the Congo has commenced to broaden greatly, and the effect at times seemed to me as if I were entering upon a great boundless lake, for there is often a clear horizon of water. At times the two distant shores are hidden by islands which appear like the mainland, so that the immensity of the stream is not always apparent. But although very broad, it is in parts, away from the central current, very shallow and needs careful navigation to avoid the many hidden sandbanks. The hills that have hitherto accompanied the stream trend away to the north, and we are at last in the great central basin of Africa and in the dense forest belt.

The climate of the Western Congo naturally varies in different degrees of healthiness and temperature according to the regions through which the river passes, but on the whole it may be said to be infinitely superior to that of the Niger or the Gold Coast. The great absence of

low, marshy ground about its banks is doubtless the cause of less virulent fever, and the regular cool breezes from the South Atlantic greatly reduce the tropical heat. The river probably is least healthy between Boma and the sea, owing, no doubt, to the mangrove swamps that inevitably attend the widening out of the embouchure. Boma itself is decidedly insalubrious. It is the hottest place on the Congo, and surrounded by many marshes. Towards Vivi it becomes decidedly cooler, owing to the greater elevation; and the higher you proceed up the river, the healthier the climate becomes. One aid to health is the magnificent drinking water that may be had everywhere above Boma; not the water of the Congo—which, though wholesome, has a disagreeably sweet taste—but the water from the unnumbered rills and rivulets which are everywhere trickling, wet and dry season alike, all the year round. Consequently dysentery is almost unknown above Vivi. The most prevalent form of sickness is the ordinary African fever from over-exposure to the sun and sudden chills. The most dangerous malady is bilious fever, the "febre perniciosa" of the Portuguese, but this is rarely incurred without much previous neglect of one's health. Beyond Stanley Pool, I can only call the temperature delightful. It ranges, at such a place as Msuāta for instance, from 87° in the shade at noon to 60° at two in the morning, and this in the rainy or hot season. The highest temperature I have ever observed at Vivi was 98° in the shade, on a very hot day. It is quite possible to walk about all through the middle of the day and not feel the heat disagreeable, provided you wear a helmet and carry an umbrella; but when you see, as I have seen, young men newly arrived from Europe exposing themselves to the noonday sun with nothing but a smoking-cap on their heads, you will hardly be surprised that occasionally deaths from sunstroke take place. And then the relatives of these victims to their own imprudence write to the papers, especially in Belgium, and speak of the cruel African Minotaur and its meal of white flesh!

The relative length of the rainy season also varies as you advance from the mouth of the Congo towards the equator. Near the sea there are about four months of rain—November, December, February, and March, with an intermediate dry season in the month of January; but ascending the river you find this gradually altering, and on Stanley Pool the rains commence in October and continue till about the 20th of May, thus leaving little more than four months of dry season. There is also here no interval in January, no "little dries," as they are called. Higher up the river still, approaching the equator, the natives tell me it rains often in June, August, and September, so that this may be called a true equatorial climate, where rain is seldom absent, and consequently, as we find at Bólóbó, this is the region of perpetual forest. The reason this forest belt does not extend more fully over Africa is that where there is a continuous dry season of four, five, or six months,

there is time for the long grass to become thoroughly tindered by the sun, and the natives can then more easily set going the great bush-fires, in which they delight, which clear the ground for their plantations, and at the same time sweep the forest from the hills. In the equatorial regions of perpetual moisture this is impossible, and so the forest country there with its somewhat peculiar fauna and avi-fauna continues to represent a condition of things which probably existed more widely over Africa before the advent of man. After all, this open country is far healthier than the dense forest.

The fauna and flora of the Congo region between the Stanley Falls, which lie almost in the centre of the continent, and the coast, are by no means uniform, and may be said to offer three distinct aspects, caused by the character of the regions through which the Congo flows.

What may be known as the first region extends from the sea-coast some eighty miles at most inland, and belongs to the marshy forest country. This swampy area, where mammals and birds are remarkable for their peculiar forms rather than for richness in species, prevails along the lower river uninterruptedly from the coast as far as Ponta da Lenha, about fifty miles from the sea, and further extends, somewhat modified in character, to Boma and beyond, where it insensibly mingles with the next, or "cataract" region, which is characteristic of the parallel mountain chains extending from the Upper Ogowé right down the continent into Southern Angola, and separating the central plateau or basin of tropical Africa from the strip of low-lying coast land bordering the sea. In this mountain district, which commences some little distance beyond Boma, and may be said to include all the cataracts or rapids of the Congo as far as Stanley Pool, the fauna and flora are of a more generalised type than those of the first and third regions, and partake more of the fauna and flora prevailing in Angola or Lower Guinea. Finally, the influence of this somewhat poor region of stony hills and rocky boulders fades away before the splendid richness of the central plateau, and at Stanley Pool new forms characteristic of Central Equatorial Africa make their appearance; and so abrupt is the change, that the upper end of Stanley Pool more resembles the regions of the Welle and the western littoral of Tanganyika in its natural history, especially in its flora, than the tract of country 20 miles off, which begins with the first cataract at the lower end of the Pool. Though I have not myself penetrated farther than about 2° 30′ S. of the equator, yet by comparing my observations with those of Stanley along the Upper Congo, and Schweinfurth on the Wellé, I have arrived at the conclusion that there is no sensible difference in the fauna and flora throughout the great basin in which the Congo flows between Stanley Pool and the Stanley Falls; nay, that over that vast tract of country there is more uniformity in forms of life than between the cataract region and the coast. It is an erroneous idea that the Congo is a natural

boundary in the distribution of certain forms, or that it even acts as a limitation southwards of the so-called West African region. I have read in many works on Africa, or on the distribution of plants and animals, that the Congo was the southern boundary of the habitat of the grey parrot, the anthropoid apes, and the oil-palm (*Elaïs guineënsis*). Now the grey parrot reaches perhaps its greatest development in Malanje, a district of Angola nearly 300 miles south of the Congo, and, together with the oil-palm, continues to be found as far as the tenth degree south of the equator; while the anthropoid apes can hardly be said to be limited southward in their distribution by the river Congo, for they do not reach even to its northern bank, or approach it nearer than Landana, 100 miles away. Near the equator it is possible that gorillas are found both north and south of the Congo, and we know that a species of anthropoid ape is found to the west of the Lualaba at Nyangwé. Again, the harnessed antelope (*Tragelaphus scriptus*) and the red buffalo (*Bos brachyceros*), both supposed to be purely West African, or "Cis-Congo" forms, are found on the Quanza river, which lies from 200 to 300 miles southward of the Congo, while other West African species do not extend beyond the equator, and therefore are unknown along the Congo in its lower course. The beautiful flower called *Camoënsia*, which was thought by Welwitsch and Monteiro to be confined to Angola, I have seen growing on the northern bank of the Congo between Vivi and Manyanga. In short, I have never seen any difference between the fauna and flora of the northern and southern banks of this great river; nor do I believe that it acts in any way as a limitation to the range of species.

The races of man that inhabit the basin of the Congo throughout its entire course—certainly in all that part of it that I have visited—belong exclusively to that great Bantu family which is so distinct from the true Negro. The adverb "exclusively" can only be modified if it be found that the dwarf races which are known to inhabit part of the country that comes within the Congo basin, can be proved to belong to a distinct variety of mankind. It is possible they may; but until this is done, I shall still assert that the races inhabiting the Lualaba-Congo from Lake Bangweolo to Stanley Pool are Bantu of the purest type. Nearing the coast, the tribes begin to lose their distinctive character, either through the degradation the coast climate seems to entail, or because they originally met and mixed with, on the low-lying coast-lands, an earlier negro population. This latter supposition sometimes strikes me as being the true one, because in such a littoral tribe as the Kabinda or Loango people there are distinctly two types of race. One, the Bantu—a fine, tall, upright man, with delicately small hands and well-shaped feet, a fine face, high, thin nose, beard, moustache, and a plentiful crop of hair; the other an ill-shaped, loosely-made figure, with splay feet, high calves, a retreating chin, blubber lips, no hair

about the face, and the wool on his head close and crisply curled. The further you go into the interior, the finer the type becomes. Such men as the Ba-yansi of Bólóbó are perfect Greek statues in the development and poise of their forms, and two points about them contrast very favourably with most of the coast races, namely their lighter colour — generally a warm chocolate — and their freedom from that offensive smell which is supposed, wrongly, to characterise most Africans. Many other details show the comparatively high status of the Upper Congo tribes: their small hands and feet, their well-shaped legs with full calves, and their abundant heads of hair. It is true that the arms are often very long, which is thought to be a sign of a low type, but this is a characteristic that is not always persistent.

The principal tribes to be encountered in ascending the Congo to the equator are, commencing at the mouth, the Ka-kongo (Kabindas and others), Mushirongos, Ba-kongo, Ba-sundi, Wa-buno, Ba-bwendé, Ba-téké, Wa-buma, Ba-nunu, and Ba-yansi. Of these the Kabindas or Ka-kongo people have been already touched on, and I might mention further that they are the Krumen of the south, hiring themselves out in all directions as servants, sailors, labourers, and affecting more particularly the Portuguese colonies, which they overrun as far as Mossamedes, invariably returning home after a time to spend their earnings. The Mushirongos, or more properly Mushikongos, are an ugly and degraded set, coming little into contact with the whites. Then we arrive at the great Ba-kongo tribe, the once ruling race of this part of the river, whose king or emperor still lingers on at São Salvador. Their dialect bears many traces of their ancient dealings with the Portuguese, many words of that language being incorporated to express new concepts introduced by the white man. I might mention, in parenthesis, that a few words of Portuguese have even penetrated into the dialects of the Ba-yansi, so great was the influence exercised by Portugal, originally, over the Lower Congo. The next tribe, the Ba-sundi, offer certain curious customs and dances which I have not time now to treat in detail. They and the Ba-bwendé are somewhat less kindly and peaceful than the other Congo tribes. The Wa-buno, on the other hand, are gentle and winning in their manners. Then we arrive at Stanley Pool and the now well-known tribe of the Ba-téké, which first make their appearance there. The Ba-téké scar their cheeks with striated lines, and wear their abundant hair in a variety of fanciful manners, more frequently strained over a hard pad into a kind of chignon. The Ba-téké are comparatively recent immigrants into the Congo valley, and as yet do not extend beyond its southern banks. They come originally from the high plateaux which form the watershed of the Ogowé, and the north-western affluents of the Congo, and have advanced towards the Congo in a southward direction. Their headquarters may be said to be the residence and town of a great Ba-téké chief, at present Mpumo Ntaba, the successor of

De Brazza's Makoko. Along the Congo, the Ba-téké often form alternate colonies with the Ba-yansi, for the two races overlap one another.

Ascending to the Wabuma river, we come upon the tribe of the same name, which inhabits the lower waters of that great river. They are doubtless the same people as the Aboma found by De Brazza near the Alima. The Wa-buma are a gentle, inoffensive race, living on the best of terms with their more intelligent neighbours the Ba-téké and the Ba-yansi. This latter race is the most highly developed I have yet met with on the Congo. They inhabit the river from the equator to the Wabuma, but extend their colonies even farther down the river. They are the great carriers of the Congo and regularly traffic between their equatorial neighbours the Bangala and the people of Stanley Pool, who in their turn carry on the ivory and other products to São Salvador and the coast. The Ba-yansi of Bólóbó have a decided indigenous civilisation of their own. Their houses are large, and fairly high, and divided into three or more rooms, the floor often being covered with clean matting, and the door, made of laths and matting, can be swung backwards and forwards on a rude hinge. Their pottery, their weaving, their wonderful power of artistic decoration, their metal-work in iron and copper, their attempts at husbandry and their contrivances for fishing and bird-trapping all show a great advance on the tribes of the lower river. I like the Ba-yansi. There is something so genial, merry, and hospitable about them, and they are so quick and free to understand a white man's ways. A Mu-yansi is a man of the world, a great traveller himself, and free from prejudices and superstitions. In fact the few remains of fetish and other ceremonies that remain among them they half apologise for. I came across none of that poison-water ordeal amongst them that is so prevalent with the coast races; I do not say it does not exist, but I never observed it. The chief of Bólóbó, Ibaka, is a great Ba-yansi chief, and his sovereignty is hereditary and his family is considered royal even in its collateral branches. He rules over a large and thickly inhabited strip of the river about 70 miles in length, of uncertain width, and with a population of about 20,000 people.

The languages of these three tribes, the Ba-yansi, Ba-téké, and Wa-buma, are Bantu of the purest type. That of the Wa-buma, however, has undergone a slight degradation in its prefixes, and has acquired a strange guttural sound resembling the Arabic *ghaïn*. In Ba-téké and Ba-yansi, or to speak more correctly, in Ki-téké and Ki-yansi, the numerals reach to 10,000 in calculation; after that they employ a word meaning "myriads," or "not to be counted." I have collected full vocabularies of these three tongues which I intend shortly to publish and to which I must refer you for fuller details.

The whole life of these people is simpler and broader than among the coast tribes, and they have far fewer intricate religious customs or peculiar observances. In fact they may almost be said to have no

religion at all beyond ancestor-worship and the propitiation of evil spirits. But their languages betray that they had, in a lower stage, a very complicated system of theology, like most low tribes, and that their dispersal from their ancient home, their roving habits, and their mixing with other tribes and other gods have probably reduced them to the state of genial agnosticism in which they now live.

A few words as to their domestic animals may be of interest. The ox is unknown, and his old classical Bantu name *ngombu* or *ngombe* is applied in the Ba-yansi tongue to the buffalo. The domestic pig is largely kept by the Congo peoples. I do not agree with the opinion of those who surmise that the pig was originally introduced into West Africa and the Congo regions by the Portuguese. The pig, in a domestic state, extends among the Bantu races right across Africa, and everywhere possesses a similar name. The pig in Ki-yansi is called *ngūlū*, and in the Ki-swahili of Zanzibar is known as *ngurūwé* or *ngūlūwe*. It is a black, bristly, high-shouldered beast, very like the Irish greyhound pig. Like most African domestic animals it probably had an Asiatic origin. The sheep is rarely met with beyond Stanley Pool, still it is known and named. It belongs to the Central African type—a hairy sheep with small horns, and a magnificent mane in the ram, which extends from the chin to the stomach, and greatly resembles the same appendage in the aoudad, or wild sheep of Northern Africa. I do not believe, however, that this domestic sheep of Central Africa had its origin in this *mouflon à manchettes* of Algeria. On the contrary, the ewe, which has no mane, and the young maneless rams exactly resemble certain breeds of Persian sheep, like which they are pied black and white in colour. The goat of the Congo is a little, compactly-built animal, short on the legs and very fat. The females make excellent milch goats, and their milk is a most delicious and wholesome addition to one's diet. The general type of dog on the Upper Congo (on the lower river it is much mixed with European races introduced by the Portuguese) is simply our old friend the pariah dog of India and the East over again, with a look of the dingo and the wild dog of Sumatra superadded. It has a foxy head, prick ears, a smooth fawn-coloured coat, and a tail slightly inclined to be bushy, and is to my thinking a very pretty creature. They have one admirable point in their character in that they never bark, giving vent only when very much moved to a long wail or howl. They are considered very dainty eating by the natives, and are, indeed, such a luxury that by an unwritten law only the superior sex, the men, are allowed to partake of roasted dog. The cats on the Congo are lean, long-legged, and ugly, and offer every diversity of colour and marking. Tabbies, however, are the most commonly seen. These cats are splendid mousers, or rather ratters, and help to rid the native villages of the small black rats which infest them.

Pigeons are unknown in a domestic state. The fowl is small and mongrel-like. It is, however, very productive. Its name everywhere on the Congo is *susu*, a word akin in origin to the *kuku* and *chuchu* of the East Coast.

Finally, there exists here and there the Muscovy duck, a bird introduced into Western Africa from Brazil by the Portuguese during the seventeenth century. It is slowly spreading up the Congo, where it may eventually meet the specimens introduced into Eastern Africa by the same people. The natives of the Congo also owe to the Portuguese the manioc root, which they largely cultivate for food, the sweet potato, Indian corn, pineapples, ground-nuts, the sugar-cane, oranges, and limes, all of which, with the exception of the sugar-cane, have come from America, and all of which owe their introduction into the dark and ill-provided continent to a little people that has to put up with a great deal of ingratitude and calumny—the Portuguese.

Up to the present time the people have cultivated little more than is just necessary for their own subsistence, but now that Mr. Stanley's expedition is in the country, with some 2000 people to be fed, it has created a revolution in the local agriculture. Many fresh tracts are now being cleared and tilled and planted with maize, and Indian corn, and bananas, for the natives, always quick to perceive anything tending to their own advantage, have found a new and sure market for their products, and hasten to avail themselves of it.

The population all along the Congo above Stanley Pool is very dense. Towards Bólóbó there is scarcely a river-fronting space clear of villages, and Mr. Stanley reckons from fuller data that the entire population of the Congo basin may possibly amount to 49,000,000! or 55 to the square mile. These masses do not own one great chief or emperor. There is no analogue to the Muata Yanvo, or the negro kingdoms further north. Such chiefs as Ibaka or Mpuma Ntaba may rule over a few thousand subjects, but ordinarily every village or settlement is a little independent state. Much has been talked lately about the desirability of introducing some sort of political cohesion amongst these tribes, of inducing them to band together into one great nationality. This idea has been put forward on high authority, but I must presume very humbly, but very decidedly, to dissent from its advisability. What has hitherto made Mr. Stanley's work so rapid and so comparatively easy has been the want of cohesion amongst the native chiefs; he has had no great jealous empire to contend with, as he would have had further north or further south. If one village declined to receive him, the next town out of rivalry received him with open arms. There has been no *mot d'ordre*, and this has enabled him to effectually implant himself in their midst. Would you now hinder this entry of civilisation by banding the native kinglets in union, union which would invariably turn them with race-jealousy against the White? No, "Divide et

impera," and don't make this great work dependent on the caprices of an African despot, for the black man, though an admirable subject, can never rule. These people are admirably disposed in their present condition to receive civilisation, but the civilisation must come not as a humble suppliant but as a monarch. It must be able to inspire respect as well as naïve wonder, and this is what the expedition as conducted by Mr. Stanley has succeeded in doing.

To realise this, let us hastily consider the state of the Congo only seven years ago, and compare it with the present state of affairs. In 1876 the European merchants had penetrated no further than Boma, where they were all established. There was not a single trading station higher up the river. No one knew anything of the country beyond Isangila, except that the natives were all cannibals. Then Stanley, after first descending the river, returned from Europe in 1879, and in 1880 commenced his present work. What has he done? Without a single battle with the natives he has rendered in three years life and property so safe that I myself could voyage 200 miles beyond Stanley Pool accompanied by only three Zanzibaris. The merchants of Boma, since Stanley's advent, have founded fifteen trading stations between Boma and the falls at Vivi. There was not a single missionary on the Congo before 1879. Now there are three flourishing missions, the Livingstone, the Baptist, and the Roman Catholic, with many stations between Stanley Pool and the sea. The river Niari has been explored throughout its course, and a direct route traced between its mouth and Stanley Pool. Establishments like Vivi and Leopoldville, which deserve to be called small towns, have been created, and other stations, numbering in all some twenty-one, have been founded; so that now, between Equator Station, at the mouth of the great Mobindu, and the coast, there is a distance of over 700 miles secured to civilisation, and offering no greater risks to the traveller than a journey up the Rhine. Mr. Stanley has three steamers on the upper river, and a small fleet of lighters and canoes. The native chiefs are his active coadjutors. He everywhere keeps the peace, and is looked up to as the great umpire in regions where he was once a hunted fugitive. In short, whichever way our sympathies may go—and as Englishmen we ought to sympathise with this splendid outlet thrown open to our commerce—we must at least admit that the work is a colossal one, and that the man who has undertaken it has the indomitable will of the Anglo-Saxon.

On the conclusion of the above paper, the President called upon Mr. Van de Velde, a Member of the Belgian International Expedition who had recently returned from the Congo, to give some account of his journeys:—

M. Van de Velde said he had spent two years with Mr. Stanley on the Congo. In the beginning of the present year Stanley sent an expedition under Captain Elliot from Isangila to explore the valley of the Kuilu river, north of the Congo, a country which was entirely unknown. At the same time he (M. Van de Velde) was sent

by sea to the mouth of the Kuilu. After two months' travel in the interior he met Captain Elliot at Kitabi between Baudouinville and Franktown, two settlements established by the Expedition on the banks of the river. The object of the expeditions was to find a good overland road from the coast to Leopoldville so as to avoid the cataracts between Stanley Pool and Vivi. Captain Elliot completely explored the country, and found many good native roads, which perhaps would be suitable for a railway direct to Stanley Pool, avoiding the cataracts and also the difficulties which the river presents above them. Other expeditions were about to be sent from Manyanga to the source of the Niari or Kuilu so as to continue the work done by Captain Elliot. Mr. Stanley had also founded a station on the coast at Massabe; another, Rudolfstadt, at the mouth of the Kuilu; another, Baudouinville, at the first cataract of the Niari; another, Franktown, further up that river, and others named Stanley, Niadi, Stephanieville, and Philippeville. All these had been founded since the beginning of the present year.

Mr. Francis Galton said that all geographers must congratulate themselves on the accession to their ranks of so able a young traveller as Mr. Johnston, who had the power of graphically describing what he had seen. He wished to ask one or two questions. Captain Tuckey in his return journey described the cataracts as having dwindled down to nothing more than the appearance of a Scotch burn, and stated that at that season of the year the volume of water passed underground, giving a very strange notion of the cavernous character of its stony bed. He wished to know what modern travellers on the Congo had to say about that statement. Another point on which he wished for information was this. In the old days of the slave trade, the men most stunted in growth and most peculiarly negro in appearance were said to come from Ambriz. It was known that a little inland the races were of a very much higher order, and Mr. Johnston had spoken of a perfect man of the world, of high intelligence, and free from superstition, who lived less than 300 miles from Ambriz. He wished to know where the lower race yielded to the higher one, and whether the transition was abrupt or gradual. It would also be highly interesting to himself to learn from Mr. Johnston, who had had the singular opportunity of comparing the races on the higher Congo with those on the Cunéné, what he considered to be their relative capacity and worth.

Mr. Johnston in reply said he saw the Falls in the full height of the rainy season, when they were supposed to present their most imposing appearance. He should think it highly improbable that the volume of water ever passed underground. In the dry season the width of the Congo was very much decreased, and as many of the worst rocks were at the sides of the river the water flowed between them with less opposition than in full flood. With regard to the natives, Stanley Pool formed a sharp line of demarcation. Numerous Bantu races were there met with, but the type became lower as the coast was approached. He had a very high opinion of the tribes on the Cunéné, the Ovampos, but they were not half so developed in intellect as the tribes on the Upper Congo. Physically they were very much alike. As Mr. Galton knew, there was a great similarity between the languages, so much so that the men from the east coast could often make themselves understood among the tribes of the Congo.

Notes on the River Mand, or Kara-Aghatch (the Sitakos of the Ancients) in Southern Persia.

By Lieut.-Col. E. C. Ross, H.M. Political Resident, Persian Gulf.

A RIVER which greatly interests us, from the absence hitherto of all accurate information about its real course and termination, is what, for want of any general modern name, I may call the ancient Sitakan or Sitakos, and which at its upper part is named, in Major St. John's map, the Kara-Aghatch (signifying "black-wood"). The identity of this with the river which flows, under the name of the Mand or Mund, or Kakee River, into the Khor Ziaret, in Dashti, may now be confidently asserted. It has, as laid down on the Haji's map, a course of at least 300 miles, and no doubt, if followed up from mouth to source, the distance would be found much greater.

The source of this considerable river is near Kodiyan, north-west of Shiraz. My personal acquaintance with it consists in having, in common with all travellers along the Bushire-Shiraz road, crossed it at Khan-i-Zinyan, and again at Kewar, where it is known as the Kewar River. I also explored the creek of Khor Ziaret, where it debouches for 12 miles. Other European travellers who have crossed the same river are M. Rivadeneyra, in 1875, at Taduan, and before him Keith Abbott, at a point still further south, in the Kir district. Thence its career has been matter of conjecture, and it is only by the Haji's map that the gap is filled. The accompanying sketch of the river and its affluents is from that source.

With regard to the origin of the name Kara-Aghatch. No district of precisely this name having been known by European geographers hitherto, the derivation of the term, as applied to the river, has been in doubt. The Persian map of Haji Mirza Seyyid Hassan, however, has a locality south-east of Karzin named "Sahra-i-Karah-Aghaj," صحرا قره اغاج. I gather from a communication from Dr. Andreas, which is given below, that the form "Karah-Aghaj" is correct, and further that besides the primary meaning of "black-wood," the term also applies to the "elm-tree." "Sahra-i-Karah-Aghaj" may therefore be rendered as "Elm-tree Plain."

The following is the very interesting communication on this subject from Dr. Andreas above alluded to; I give it in his own words, being responsible myself only for the English rendering of the quotations from the Arabic authors.

"The name of the Kara-Aghatch River * is explained by the people, even without asking them, by 'Chob-i-Siyah,' i.e. black-wood, which

* A locality named Kara-Aghatch is also found in the Sarhad of the Kashgai near Dana.—F. C. A.

Sketch Map of the
RIVER MAND
or
KARA-AGHATCH
52
54
29
Persepolis
ARSINA
Kodiyan
Zirgan
Arsinjan
Deh Mor
Diris
Kazran
Sharusca
Khisht
Konartakteh
SHIRAZ
Darian
Dodeh
Pul-i-Fasa
Kanar
Kohnis-i-pain
Kavar
Kohnis-i-bala
Niris
Schmal
BUSHIRE
Dehrud
Kalimeh
Kafr
Fasa
Shishdeh
Madawan
Darab
Firuzabad
Farashband
Bushkan
Asmanjird
Tadwan
Mukhak
Bab Arab
Akun
Heidarabad
Shamsabad
Jahrum
Kusu
Aliabad
Difarjan
Pasruduk
Jarmusht
Ferakhabad
Baghan
Sana
Shambah
Laveh
Mankal
Barak
Lazr
Khor Ziyarat
Ziru
BIDSHAHR
Persian Gulf
TANGISTAN
DASHTI
Mand R.
KARZIN
English Miles
0 5 10 20 30

is a literal translation of the Turkish name; but besides this literal meaning, 'Karah-Aghaj' is the Turkish name for the elm-tree (*Ulmus*). As far as known, there is near the river no district or place which is called Kara-Aghatch, and from which its name could have been derived. But I think that the name must have originated from the fact that at some place near the river, most probably near its source, a greater number of elms is to be found, or was so in former times. An example of a locality named after trees of which now not a single one is anywhere to be found, is the 'Desht-i-Safiddar'—'the Plain of Poplars'—in the country of the Rustam Mammassani. With the exception of two or three solitary willow-trees, not a single tree is now to be seen in this place.

"The sources of the Kara-Aghatch River are to be found in a locality, as far as I have been able to ascertain, without fixed habitations, called Bun-ru, i. e. Bun-rud, a name sufficiently significant, and visited by members of the small group of Iliyat tribes known by the name of Chehar-Bonicheh.*

"The most important fact which I have ascertained through the information I have collected in different parts of the country is the identity of the Kara-Aghatch River and of the Khor-i-Ziaret, or, as it is called in the Dashti, the Mund River, and I hope to have the opportunity of proving by actual survey the justness of my conjecture. Abbott formerly suggested that it falls into the Persian Gulf between Kenghan and Assalu, and St. John points out 'Bardistan' as the most probable locality; but the right thing was already suggested by Kiepert, in his map of Western Persia, published in 1851.

"Captain Durand has shown me the map which accompanies your report of your trip to Shiraz. I see thereby that you too consider the 'Kara-Aghach' and the 'Khor-Ziaret' or 'Mund' to be the same river.

"With regard to the names by which the Kara-Aghatch river was designated in ancient and mediæval times, I have collected, as far as it is possible without a library, all the passages and combined them together.

"The earliest mention of it occurs in reference to the voyage undertaken by the fleet of Alexander the Great from the Indus to the Euphrates, of which two accounts existed in ancient times, one by the admiral of the fleet, Nearchus, the other by the pilot of the fleet, Onesicritus. In the first, an extract of which is preserved in Arrian's 'Indica,' the Kara-Aghatch River is called (chap. 38) 'Sitakus.'† In the second, from which Pliny‡ has borrowed some details, not

* They comprise the Korani (Korooni), i. e. Bunrui, the Zanganah, the Ardashiri, and Vanda. The former two belong to the Lak tribes, the latter two are Lurs. The Chehar-Bonichah generally join the Kashgai.—F. C. A.

† This, and not Silakus, is the true reading, *t* and *l* being often confounded in Greek MSS.—F. C. A.

‡ Nat. Hist., vi. 26.

directly, but secondhand, from a book of King Juba, the name assumes a slightly different form, 'Sitioganus.'* The difference of the names 'Sitakos' and 'Sitioganus' is easily accounted for. It frequently happens that Greek writers, when they come across a foreign name which in its form bears some resemblance to the oblique case of a Greek noun, transform it into a corresponding Greek nominative. In this case Nearchus, no doubt, heard the name pronounced 'Sitakon' or 'Sitakôn,' and this would be in Persian ستکان 'Sitakan,' and he himself, or perhaps Arrian, accordingly formed a nominative 'Sitakos.' In 'Sitioganus' the *us* is a Latin ending. The *g* instead of *k* is due to a phonetic change very common in Persian, and can only be looked upon as a difference in pronunciation; the only real difference consists in the *i* following the *t*, but here a very simple and easy emendation gives the right form, viz. instead of 'Sitioganos' read 'Sittoganos.' This form with double *t* will be supported by another combination to be mentioned further on; so that Onesicritus has been a trifle more accurate than Nearchus or Arrian.

"Pliny, that is Onesicritus, says that on this river one navigates up to Pasargadæ in seven days. This of course is not true. But such a statement is not to be wondered at, when we consider how frequent fabulous accounts of the origin and course of rivers are to be found in the history of geography. It only shows that people at the mouth of the river knew that its course was very long, and that it came from somewhere up country, perhaps not far from the royal cities of Fars. They may also have combined it with the Pulvar.

"Next comes Ptolemy,† whose knowledge of the Indian Ocean and Persian Gulf is evidently based on log-books from the time of the Ptolemean dynasty in Egypt, and of the first Roman emperors. He mentions‡ at the place where we would expect the Khor-i-Ziaret, the mouth of the river Brisoana ('Brisoana Potamon enbolai'). Brisoana must be in old Persian 'Berezvan' or 'Berezvana' (Epzend, Berezvant), and signifies 'The Mighty' (river); the name being only an appellative. Marcian Heracleensis copies faithfully Ptolemy. I am not aware that any other mention is made of the Kara-Aghatch River in Greek writers.

"But the Arabic geographers know the river quite well, and described its course with great accuracy. It will only be necessary to quote Istakhri's 'Kitab ul Memalik val Mesalik.'§

* This is the reading of the best MSS. Some write Sitiogadus and Sitiogagus, which is wrong, but generally met with in older books.—F. C. A.

† Second cent. p. Chr.

‡ Geog. vi. 4.

§ Ibn-Haukal's 'Kitab-ul-Mesalik' (Ar. text edited by De Goeje, Leyden, 1873) is only to be considered as a new edition of Istakhri, with additions and corrections. The passage on the rivers of Fars is almost identical in both.—F. C. A.

"'As to the river 'Sakkan,' it issues from the lands* of El-Ruweyhan† from a village called 'Sha'fari,' the fields of which it waters. Then it flows to the district‡ of Siah, and waters it; thence to Kewar, and waters it; thence to Khabr, and waters it; thence to El-Simakan, and waters it; then to Karzin, and waters it; then to a village named Sakk. And (the name of?)§ this river‖ is referred to Sakk. Then it falls into the sea. Now there is no river of Fars more fertilising than this river.' (Edit. de Goeje, Leyden, 1870, p. 120. Comp. Ibn-Haukal, p. 191.)

"'And the road from Shiraz to Jennabeh; from Shiraz to Khan-el-Asad,¶ which is on the river El-Sakkan, six farsakhs, and from the Khan to Dasht-i-Arzan Khan, four farsakhs.' (Ibid., p. 130.)

"These passages leave no doubt as to the identity, and I have therefore only to add a remark on the name 'Sakkan,' of the 'Kara-Aghach,' and 'Sakkan.' Every one who has read old Arabic MSS. knows that when *s* is preceded and followed by *d*, *t*, and *c*, the latter stroke is very easily left out, the copyist not being over anxious to make a stroke more or less, especially as the diacritical points are generally omitted in proper names.

"Being acquainted with the old name of the river 'Sitakan,' or 'Sittakan,' I think it would be one of the easiest emendations to read instead of 'Sakkan' سكان ستكان ستكان, 'Sitakkan,' or as the teshdid on the *k* is quite anomalous, 'Sittakan.' This I believe to be the true form of the name corresponding exactly to the 'Sittogan' of Onesicritus in the MSS. of Istakhri; the *t* inadvertently was dropped by the copyist, but the teshdid belonging to it was preserved and transferred to the *k*.

"For completeness' sake I may mention that Hammer, and following him Ritter,** identifies the Sittoganus, for which he reads Sitiogagus, with the 'Sitarejan' of the Arabic geographers. But the 'Sitareja' (Istakhri has 'Shazkan,' Ibn-Haukal 'Shadkan,' evidently a better reading) is, and can easily be ascertained by the text of these authors, one of the rivers belonging to the northern parts of Dashtistan."††

* I have simply copied the text of De Goeje, without making any corrections. Instead of "El-Ruweyhan" I read with Edrisi "Ruijan," which is certainly connected with Rud, Ru in Bunru-siah now Siakh-Khabr, now Khafr.—F. C. A.

† "Rustak," a cultivated place, also border district.—E. C. R.

‡ Rustak.

§ Compare with course of river on sketch map accompanying the Administration Report for 1875-76. The Arabian writer leaves in the lurch just where we most require information.—E. C. R.

‖ "Wadi" in original, which also means "valley."—E. C. R.

¶ Khan-el-Asad, now Khan-i-Zinyan.—F. C. A.

** 'Geography of Asia,' viii. p. 763.

†† Not Dashti. These two names are not identical.—F. C. A.

M. Révoil's Journey into the South Somali Country.

The Geographical Society of Marseilles has received information from Zanzibar, dated 5th October last, that M. Georges Révoil (see July No. of R.G.S. 'Proceedings,' p. 429) had succeeded in reaching Gananeh on the Upper Juba; and also a letter from the traveller himself, dated Gualidi (Geledi or Jilledy) on the river Webbe or Wobbi ("Ouébi Doboï") the first station on the route from Magadoxo to Gananeh. M. Révoil left Zanzibar early in May, reaching Magadoxo on the 14th of that month after a very dangerous passage—an Arab dhow which sailed in company with him being lost with her crew in sight of Merka.

M. Révoil stayed from May 14th to June 25th at Magadoxo, being entertained by Salem-Ben-Amari, an Arab merchant of the town, whose co-operation and active help were of the greatest value. He passed this time in organising his caravan and making ethnographical and zoological collections, taking also several photographic views of the town and its neighbourhood. Commandant Guillain was stationed here in 1848, when on his expedition to the Benadir Somali coast, and had not much difficulty in getting to Gualidi, expending only some 30 piastres as presents or backshish. Things are however much changed since then: in spite of the official protection of the Sultan of Zanzibar and the good offices of the Zanzibar governor of Magadoxo and Salem-Ben-Amari, M. Révoil was subjected to great exactions at Gualidi, and could not have spent less than 500 piastres on a single day's march between Magadoxo and that place, without reckoning numerous presents.

Various Somali tribes or clans claim the territory between these towns and the possession of the road connecting them, resulting in incessant quarrels and daily bloodshed in the environs of Magadoxo and sometimes even in the town itself. The most important of these tribes, which holds the caravan road from Magadoxo to Gualidi and thence to Gananeh, is that of the Gobrons, whose chief Omar Yusuf, a tributary of the Sultan of Zanzibar, resides at Gualidi. It was Achmet Yusuf, a brother of this chief, who traitorously poisoned the German traveller Kugelbach. Between Gualidi and Magadoxo, and even in the former territory, the supremacy of this tribe is however stoutly disputed by the Wadans—a rivalry which results in reduplicated exactions on the traveller, and a regular competition as to who shall levy the greatest contributions.

Omar Yusuf sent 200 men of his escort in front of M. Révoil to protect him as far as Gualidi. Directly on leaving Magadoxo, the explorer and his followers found the road stopped by a troop of Bedaween of the nomad Abgal and Mursoudé tribes, and they only got over this difficulty by the help of the escort, who kept the Arabs in awe while the caravan regained the road by a circuitous path. This operation had to be repeated two or three times in the day; and there was even a slight

skirmish at the gates of Gualidi, where, after seven hours' forced march at racing pace under a perpendicular sun, the traveller and his followers arrived on the evening of the 24th of June.

M. Révoil was obliged to stay more than a month in this Somali town, and it was not till the end of July that he was able to start for Gananeh.

He gives the following sketch of the place:—Gualidi, situated on the Webbe, is divided into six "quarters" placed on both banks of the river, and some of which are rather distant from the main town. The natives live in conical huts called *min*, the framework of which is made of hoops and wattles and supported by a large post reaching from summit to base. Each Somal possesses two or three of these huts, surrounded by an inclosure with smaller outbuildings of the same form, used for cattle, cooking, or stores.

The mosques are isolated from every habitation, and are simply large huts of the same construction as those above mentioned, carpeted with ox-skins.

The Webbe, which runs through Gualidi, had at the season of M. Révoil's visit a yellowish muddy current, and was but little over 98 feet in width. Ibis, plovers, and wild geese people its waters; on its banks enormous crocodiles slumber, and baboons and grivet monkeys play. Vegetation is not so luxuriant as might be imagined in a river so near the equator; nevertheless the landscape is very picturesque and animated, especially in the morning. Here and there are located marketing places for corn and cattle, with slaughter-houses in the open air; and the Somali pass from one bank to the other on wherries dragged along cables of twisted creepers. The land is cultivated, and has fine meadows. The natives go about the town unarmed, and employ Unyamwesi and Galla slaves for the most troublesome work. The Somali of this region are much less warlike than those of Cape Guardafui visited by Révoil, but they are perhaps more cruel, and their knavery and rapacity are much more to be feared. In other respects, morals are not so severe as with the Somali of the Gulf of Aden, and the dances of the Gobrons are of the utmost lasciviousness.

During his stay at Gualidi, Révoil had to complain of numerous thefts, and it was not without trouble that he obtained restitution of articles stolen from him, even by the chief Omar Yusuf's own brother. The chief himself, rather an old man, lives huddled up in a wretched hut, to which he is confined by an incurable wound in his leg. He has for many years fasted in the daytime, and passes a part of the night in prayer. Révoil had many conversations with him during the weary month spent in haggling over his journey to Gananeh; and it was only by the pressure of the Governor of Magadoxo and a threat of the anger of the Sultan of Zanzibar, that the chief finally agreed to comparatively reasonable conditions for the assurance of his protection.

Révoil was compelled to exercise very sustained energy and patience in the face of the exactions and importunities of which he was the object. All his native servants abandoned him in turn during the feast of the Ramadan; but to make up for this he cannot sufficiently praise Julian Teissère, a native of Cassis (Bouches-du-Rhône), whom he brought with him,—an old sailor, whose zeal, activity, smartness, and devotion were of the most valuable aid to the explorer. These two shared the work of guarding stock and preparing collections. In spite of all the troubles undergone, the health of the travellers was good, beyond some slight attacks of fever and the painful results of insect-stings from which M. Révoil suffered.

The traveller left Gualidi towards the end of July, and from the Zanzibar despatch must have arrived at Gananeh at the end of August. The news was doubtless brought by caravan to Magadoxo and sent on from thence to Zanzibar. The letter from Gualidi, of which the above is an outline, was carried to Zanzibar by the Sultan's soldiers, who undertake the service by land when the monsoon shuts off communication by sea between the Benadir coast and the island. According to M. Révoil's estimation, it may be considered that he has just accomplished one of the most difficult parts of his mission. From Gananeh he intends to go among the Gallas, and to regain the coast-line of the Gulf of Aden either by Harrar or Shoa.

GEOGRAPHICAL NOTES.

Progress of Mr. Thomson.—By telegram from Zanzibar we have the gratifying news that the expedition under Mr. Joseph Thomson had been heard of as being, on the 1st of August, in the neighbourhood of Lake Naivash, i.e. about 120 miles north-west of Mount Kilimanjaro. The telegram concludes, "All well; no letters."

Consul O'Neill's Expedition.—We have received through Mr. W. T. Ansell, of the Eastern Telegraph Company, the following telegram reporting the progress of Mr. O'Neill:—"Matakawe, lat. 15° 10′ S., long. 36° 15′ E. September 30.—Left Namúrola on July 30th, and crossed on August 13th and 14th the Inagu Hills at an elevation of 4800 feet. East of Inagu (flows) the Malema river; west of Maltma (?) Valley (rise) the Namuli Hills. Greatest elevation reached 5423 feet. I estimate Namuli Peak at 8500 feet, and Palawa of the same range at 7500 feet. Leave for Shirwa to-morrow."

King Mtesa.—Sir John Kirk writes from Zanzibar, September 22nd, that the rumours of the death of King Mtesa, current in Europe last July, are not supported by anything known at Zanzibar, and are

generally discredited by those Arabs who are best acquainted with the interior. News of such an event would, Sir John thinks, have reached the coast had it really occurred.

Mr. M'Nair, whose adventurous journey in disguise to the Chitral Valley we announced in our September number, has arrived in England, and we hope will give us an account of his experiences and observations at an early meeting. He succeeded in penetrating one of the outlying valleys inhabited by the Kafirs, and is thus the first European who has seen these interesting people in their own land.

Proposed Expedition to Takht-i-Suliman Peak.—The Indian papers report that the Government contemplate sending a surveying expedition to the Takht-i-Suliman, a rugged barren peak which rises 60 miles due west of Dera Ismail Khan, and towers above all other peaks of the Suliman range. The summit of the mountain is a narrow plateau stretching from north to south some five miles, with a peak at either end over 11,000 feet in height. From this point the surveyor will command an excellent view over a wide expanse of country to the south-west, through which pass some of the most important roads from India into Afghanistan. This country, though marked as a blank on the maps, has been fairly explored by native surveyors, and the information could be pieced together and made thoroughly reliable if a few trigonometrical positions were fixed; and Major Holdich, who has been recommended for the work, anticipates that a day's observation from the peak of Takht-i-Suliman would be the means of mapping some 50,000 square miles of a very important part of the independent territory lying immediately beyond our Indian north-western frontier. The Shirani tribe having tendered their submission to the British authorities, the present time appears favourable for carrying out the projected expedition, and from the *Civil and Military Gazette* of Lahore it appears that it will probably soon start.

Expedition to South-western Beluchistan.—An expedition under Sir Robert G. Sandeman, K.C.S.I., has just started for South-western Beluchistan. Its objects are mainly political, being principally the adjustment of long-standing differences between the Khan of Khelat and Sirdar Azad Khan of Kharan, but opportunity has been taken to attach two engineer officers, Lieut. the Hon. M. G. Talbot and Lieut. Wahab, to the expedition for the purpose of making surveys and reconnaissances, and, generally speaking, increasing our geographical knowledge of the country traversed. The sanctioned arrangements were that the party should assemble at Sibi on the 15th of November, and march to Khozdar by Gandava, Katchi, and the Mulla Pass. From Khozdar it would proceed to Kharan and afterwards make for Panjgur, which Azad Khan complains that he has been unfairly deprived of. Then the party will journey to Kej, where the matter of the disturbances created by the

powerful Rind tribe of Beluchis in Mekran call for attention, and on completion of that business proceed to Gwadur on the coast, where a steamer will be in readiness to convey them back by way of Karachi.—Panjgur and Kej were both visited by Sir Charles Macgregor in 1877, but respecting Kharan we are dependent for information almost entirely on the account furnished by Haji Abdul Nabi, who visited it in 1838. Its chief products are wheat, barley, and *shakar gaz*, a sweet gum exuding from the tamarisk; assafœtida is grown in the hills adjacent, and the only two fruits are melons and dates. The camels of Kharan are the most celebrated in Beluchistan for strength and activity. In 1838 the ruler had in his pay 60 horsemen mounted on his own horses; the male population was then estimated at about 3000. Pottinger's route in 1810 passed north of Kharan, and Macgregor did not approach it nearer than Budu, which lies some 60 miles W.S.W., so that the fixing of the position of Kharan is a geographical desideratum.

North-west Borneo. — Mr. Leys, Consul-General in Labuan, has recently visited various rivers on the north-west coast of Borneo in the territories of the Sultan of Brunei, and near to the frontier of the British North Borneo Company, with the object of acquiring information respecting the inhabitants and the nature of the native government on their banks. A launch was lent to him for the purpose by one of the chiefs of Brunei. The three rivers visited were the principal streams opening into the Brunei Bay, namely, the Padas, the Lawas, and the Limbang. Of these, the Limbang is the largest and nearest to Brunei, the capital, while the Lawas is further from the seat of government, and the Padas still further to the north. The length of the Limbang Mr. Leys estimates at 130 miles—that is, he believes it might be ascended by a steam-launch for that distance. The Padas comes next, with a length, similarly estimated, of about 100 miles; while the Lawas proper is quite a short river of only some 30 miles. The Limbang and Padas rivers have each, comparatively speaking, large populations on their banks, which are flat, and grow large quantities of sago; while the country through which the Lawas flows is sparsely populated, but beautiful, with abrupt hills covered with luxuriant tropical forests. The Lawas has of late been visited every two or three years by European botanists or by Labuan Government officers. The Padas, as far as Mr. Leys is aware, has been visited by Europeans only four or five times during the last thirty years: while the Limbang, being the furthest of the three from the residences of Europeans, appears to have been visited only once by a European, namely, Mr. Consul-General St. John, in 1858.

New German Geographical Society.—The recently founded Geographical Society of Greifswald, in Pomerania, of which a preliminary notice was given in the R.G.S. 'Proceedings' for 1882, p. 244, and which

now numbers 216 ordinary members, has completed its first annual volume of publications, under the editorship of its President, Prof. Rudolf Credner. In the first section, which is of general interest, Dr. Hübbe-Schleiden, of Hamburg, contributes a paper on the opening up of Inner Africa from a commercial point of view; Dr. F. W. Paul Lehmann discusses the Upper Hungarian Carpathian region; Herr F. G. Müller-Beeck reviews our scientific knowledge of Corea (giving an illustration of ethnographical objects from the Joest collection in the Berlin Museum), accompanied by a bibliography; and Dr. Steinhausen writes on the educational aspects of Geography. The second section is devoted to local subjects, containing (1) a digest of the literature bearing on the geography, topography, geology, hydrography, climate, ethnology, fauna and flora, history, &c., of Hither Pomerania (on the left bank of the Oder) and Rügen, arranged by subjects, and forming a bibliography of 34 pages; and (2) a paper by Prof. Scholz, calling for special observations on glacial phenomena and their influence on orographic and hydrographic conditions in the province of Pomerania and neighbouring districts, in which the importance of accurate local information is urged. The third section consists of correspondence, containing a letter (originally published in the 'Deutschen La Plata Zeitung' of 21 and 22 April last) from Herr Georg Rohde, describing his rediscovery in the Patagonian-Chilian Cordillera of the Pass of Bariloche, which he has named the General Villegas Pass. Herr Rohde reckons his journey from the top of this pass to Reloncavi Bay at 19 leagues, with all deviations, and the whole distance from Lake Nahuel Huapi to the coast of the Pacific as 30 leagues, capable of reduction by a straighter route to 24 or 25 leagues; the ascents and depressions are all easy, and a loaded caravan will be able to go from the lake to the sea in three days as soon as a road is opened through the forest. A paper, by Dr. Stöwer, on the excavations at Gross-Tychow in Further Pomerania, and an account of the composition and year's Proceedings of the Society conclude the volume.

Mr. John Forrest's Explorations in N.W. Australia.—A recent official report of the Hon. John Forrest, Surveyor-General and Commissioner of Crown Lands, contains particulars of the topography, condition, and capabilities of the Kimberley District, North-western Australia, accompanied by an excellent map showing his route and the natural features of the country. This well-known Australian explorer here elaborates and supplements the work of his brother Alexander Forrest, whose original journey in the same region is recorded in our 'Proceedings' for 1880, p. 512. The country examined is, roughly speaking, from Roebuck Bay on the west coast, 18° S. lat., eastward across the Fitzroy river to the Napier range (125° E. long.), 27 miles west of Mount Browne, and northwards along the eastern side of King Sound to about 16° 35′ S. lat., some 1000 miles being travelled with Mr. Brooking, in charge of the Kimberley Survey, and Mr. Hardman, Government geologist. Its general character is low and flat towards the seaboard, the marshes often extending inland for many miles. Thence the land rises gradually

into gently undulating low hillocks, rarely exceeding an elevation of 50 feet, which are usually densely wooded with low gum trees and acacias, alternating with very extensive alluvial flats seldom bearing anything but luxuriant grass. The Usborne ranges in the north are the only elevated ground; they extend laterally north-east, trend in a generally north-west direction, and are penetrated by deep gorges having the same bearings, and occupied by running streams. The greatest elevation observed was 475 feet, three miles east of Port Usborne. Starting from Roebuck Bay on 13th April last, Mr. Forrest struck inland eastwards through a lightly wooded and coarsely grassed country, well suited for cattle, to the Logue river. This is a small watercourse, apparently not permanent, running through a flat and splendidly grassed district; as it was descended, the country became more open and grassy up to the Fitzroy, on the eastern side of which was a magnificent alluvial plain six miles wide, intersected in all directions by sheets of water. Crossing this, Mr. Forrest travelled northwards on the eastern side of the estuary of the Fitzroy, through marshy land bounded by a country wooded with eucalyptus, cajeput, and baobab trees, called "Pindan" by the natives, to the site of the proposed town Derby, at the bottom of King Sound on the mainland opposite Mary Island, thence reaching the valleys of the May and Meda rivers on the east. So luxuriant was the grass in the extensive plains here, that the whole country is described as resembling an immense hayfield; and progress was actually impeded by its thickness and height on the banks of the Meda, where the natural yield could not in many places be less than three tons per acre. From the Meda, the party went northwards as far as Port Usborne, passing fine water springs in large clumps of palms, ferns, and other tropical trees, a greater appearance of tropical vegetation being seen here than further south. A large river (named the Robinson) coming from the east and several running streams (named Townshend, Keightley, Stewart, and Trent) were discovered and partly followed, all lined with trees and densely grassed, though the immediate country as a whole is thinly timbered, with no extensive plains. West of Port Usborne towards the sea, the country became very hilly, with contracted valleys, sometimes almost unapproachable and inaccessible, but well watered and grassed, and finally consisted of a succession of parallel ridges or spurs falling into the sea, with very deep gorges and narrow intervals in which outcrops of basalt were generally observed. This final portion had to be traversed on foot, being not practicable for horses. Port Usborne may, in Mr. Forrest's opinion, be dismissed from calculation as likely to be of use in the immediate future, being to the last degree sterile, rough, and difficult to get at. No means of approach to the sea could be found, except by one narrow valley. Retracing the route south and south-east to the Meda, that river, with its parent stream the Lennard, was followed up eastward, and the neighbouring country examined. The Lennard rises in the Leopold Ranges, and about 30 miles from the sea forms a delta, the northern branch of which is called the Meda, and the southern the May,—the inclosed land, as well as the plains to the north and south, comprising some of the finest pastoral country in the district. The great plain to the foot of the Leopold Ranges had been burnt by the natives for quite 100 miles, doubtless to remove obstructions in travelling, but also for the purpose of getting the pigeons' eggs that are afterwards collected in large numbers. After leaving the Lennard where it runs through a remarkable gorge with perpendicular cliffs in the Napier range, Mr. Forrest struck south and south-west towards the Fitzroy, reaching it near Mount Wynne, close to which he discovered a new lake of about 30 acres, named Josceline by him. The country between the rivers has no elevated waterparting, but is generally a plain, grassy in some places, in others sandy with spinifex; it is deficient in surface water and lightly wooded, with nothing tropical in its aspect. The valley of the Fitzroy

was followed to the sea, and Mr. Forrest says that the appearance of this immense running river converting an almost desert country into extensive alluvial flats, ready to be covered with flocks and herds, is a scene not often witnessed in West Australia. Its plains are less level than those of the Lennard system, but have larger and more permanent water-pans, the Fitzroy itself running at all seasons.—Having returned to Roebuck Bay, Mr. Forrest travelled south along the coast-line to Cape Villaret and Lagrange Bay, through a country containing a numerous native population, as evidenced by many wells of good water, and hundreds of well-beaten paths from the sea to them. The plains here were chiefly covered with salt grass, but the coast became higher and bolder southwards, with many ravines, being also thickly wooded and for the most part covered with spinifex. Mr. Forrest finally returned to Roebuck Bay on June 19th.—The heat is described as not oppressive—not nearly so fierce as in Perth at the same temperature (80° to 90° Fahr. at noon in shade), but mosquitoes were found of the greatest possible annoyance. Game was abundant in most parts, especially ducks, which swarm on the water-holes of the Fitzroy and Lennard plains; kangaroos and emus were also found. Alligators were plentiful at the mouth of the Fitzroy and in some other rivers entering King Sound; a smaller species was very numerous, specimens being found 20 miles from the sea in fresh running water.—The whole district is reported as admirably adapted for cattle and horses, but it is evidently unsuited for sheep, except for acclimatised merinos. There is abundance of timber, but it is scarcely fit for building purposes.

Obituary.

Mr. James Stewart, C.E.—We have already, in the introductory note to his letter to Mr. Stevenson, in the first page of the present number, alluded to the death of this able and zealous explorer of Lake Nyassa and the surrounding region. His loss will be keenly felt by all who are interested in the opening up of Central Africa to civilisation and legitimate commerce, and the more so as the work on which he was engaged, the construction of a road between Lakes Nyassa and Tanganyika, along which a steamer was about to be conveyed in sections for embarkation on the latter, remains unfinished.

We learn from a brief memoir by Dr. George Smith that Mr. Stewart was a cousin of the Rev. Dr. Stewart, of Lovedale in Cape Colony, and that he received his early education at Madras College, St. Andrews, passing as a trained engineer, and proceeding thence to India to serve in the Public Works Department. He was employed there exclusively in the Punjab, and after eleven years' service took the usual furlough. Instead, however, of spending his holiday at home, he visited the Livingstonia Mission of the Free Church of Scotland on Lake Nyassa, then recently established, about the year 1877. Here he offered his gratuitous services to the new settlement, and made the road, 70 miles long, round the Murchison Rapids on the river Shiré, by which the steamer *Ilala* was carried in 700 sections on its way to successful embarkation on the lake. His zeal for the work and his earnest character prompted him to throw up his high pay and prospects of advancement in India to become engineer to the Mission in 1878. He explored and mapped first the western and northern, and afterwards the eastern shores of the lake, surveying the harbours, and adding also much to our knowledge of the bordering inland country and its inhabitants. It will be fresh in the remembrance of many Members of the Society how he nearly anticipated Mr. Thomson in crossing the previously unvisited tract of land between Nyassa and Tanganyika. Starting with a small party on the 14th of

October, 1879, unconscious that the Society's expedition was not far distant to the north, he reached Pambete, on the southern shore of Tanganyika, only a few hours after Mr. Thomson, and rendered great service to our traveller and to geography by taking a set of lunar observations to fix the longitude of the place. During a visit he subsequently made to England in 1880 he read a valuable paper on his discoveries, which was published, with a map of his surveys at the northern end of the lake, in the 'Proceedings' for 1881, p. 257. On his return to the scene of his labours in 1881, he was commissioned by Mr. James Stevenson of Glasgow with the important work of constructing the "Lake-Junction" road already mentioned, Mr. Stevenson generously furnishing 4000*l.* to defray the cost. He took with him a staff of artisans, and has since been labouring with varying fortune at this difficult task. A sanguinary attack by a neighbouring chief on his native workmen compelled him to suspend the work for a time, and he employed the interval in completing, on behalf of the Free Church Mission, the survey of the east coast, his charts of which accompanied the last letter he wrote to his munificent employer. Peace and good feeling among the natives along the line of his unfinished road having returned, he resumed his labours on the road, and soon made so much further progress that he was able to inform the London Missionary Society that the way was open for the steamer *Good News*, which they had ready for Lake Tanganyika, and the vessel has since been conveyed in sections viâ the Zambesi and Shiré to the head of the lake by the commercial "African Lakes Company," under the superintendence of the Messrs. Moir.

It is supposed that the fever which has robbed us of this indomitable and skilful pioneer, who was doing so much work of the best kind in the "Dark Continent," was contracted in the lower reaches of the Shiré, from near which the postscript to his last letter was dated. He was about forty years of age.

CORRESPONDENCE.

Voyages and Map of the Zeni.

51, Holland Road, Kensington,
November 10*th*, 1883.

In answer to Professor Steenstrup's theories noticed in the last number of the 'Proceedings,' I beg leave to make the following statements. The original of the Zeno map was laid down 500 years ago by Venetians, roughly to illustrate family letters and a book, describing northern countries, whose language was not only strange to them, but diametrically opposed to the genius of their own. These documents were not intended for publication, for printing was not known till half a century later, and, in fact, they remained unpublished for a full century after that. In 1558 a descendant of the family, who in his boyhood had torn and mutilated the papers, repaired his fault to the best of his ability, and putting his own blamelessly ignorant construction on the language of the text, endowed the map, then rotten with age, with *additions* which have since caused a great amount of perplexity. He then published extracts from the letters with the map as an illustration.

Now, of all the extraordinary phenomena exhibited in Professor Steenstrup's marvellous book, one of the most astounding to me, who for nearly forty years had our national collection of maps and charts under my care, is that a critic should expect a map such as I have described to be so microscopically correct in detail as to "correspond" (with respect to the contour of Frislanda) "with the modern map of the Færöe Islands." As not only the Færöes, but the Shetlands and the

Orkneys, all of them groups, are alike unceremoniously laid down on the Zeno map as single islands with a few islets near them, it is not surprising that "Frislanda," which is squeezed down into the shape of an ugly pumpkin, should not very exactly "correspond with the modern map of the Færöe Islands." Nevertheless there *are* names on the one which *do* correspond with names on the other, and which I invite Professor Steenstrup to reproduce collectively, if he can, in the *real*, *uninvented* nomenclature of any island or group of islands whatever. Monaco (the Monk) lies correctly at the south of the group, while Andefort (Andefjord), *pace* Professor Steenstrup, is remarkably near its right position in the north. Sudero Golfo (Suderöfjord) which does not (as is suggested) mean the Southern Gulf or Fjord, but the Gulf or Fjord of Suderöe (the southern island), takes its name from the southern island of the Færöes, which, then as now, bore the name of Suderöe. It is the channel between that island and Sandöe, the Sanestol of the text and map. This *could not be laid down in its right place on a map which did not divide the group into its separate islands.* The same with Ledovo (Lille Dimon) which lies in that channel. So also, of absolute necessity, was it the same with Streme (Strömöe), the name of which occurs at the spot where its south-east extremity would terminate, somewhat below the capital, Frislanda, which also is in its right place. And here I would call attention to the fact that the only town then and now existing in all this group lay on the south-east side of Strömöe, by far the largest and most important island, and, both in the map and text, this town, now known as Thorshavn, is named Frislanda, in accordance with a well-known custom in the middle ages of giving a capital the name of the country. This island would, therefore, naturally be the resort of Zichmni and of the Zeni when visiting the group, and one must be very difficult to persuade who cannot see the reasonableness of the name of Frislanda being used in reference to such visits, to the exclusion of that of Strömöe. This would account for Frislanda being twice spoken of in the text as an island. One thing is certain, that there is no mention of Streme in the text. That it should be placed on the map near a small island is very sad, but I, for one, am a very lenient judge of a map made 500 years ago, especially by Venetians among the Norse. Orkn-eyar (the Orkneys) was a sound very difficult to Italianise, but from their position, they are evidently the "little islands" forming the Porlanda of the text. The *superfluous* Porlanda, between the south of Frislanda and the Monk, is an obvious addition by the later Zeno from his reading of the text. The Orkney group of the early map contains no names beyond the clumsily transcribed general designation of "Porlanda" or "Podalida," but on Estlanda (Shetland) where Nicolò Zeno lived for a considerable time, there are a host of names unmistakably corresponding with those in the Shetlands; e. g. Cledere (Queendal), Sumbercouit (Sumburgh Head), St. Magnus (St. Magnus Bay), Scaluogi (Scalloway), Bristund (Brassa Sound), Itlant (Fetlar), Lonibies (Lambness), Onlefort (Olna Fiord) and Oloford (Onze Fiord). Nevertheless, Estlanda, like Frislanda, is laid down as a single island with a few islets near it. It is therefore childish solemnly to place the arbitrary and manifestly inaccurate contour of the Frislanda of 500 years ago, side by side with the modern accurate map of Iceland, in order to show a similarity of outline, and thereby to aim at proving a discrepancy between the map and the text of the Zeno publication. Yet on this basis Professor Steenstrup decides that "the Frislanda of the map is Iceland," although both Frislanda and Iceland hold their respective places on the map, and in the text also the two are mentioned together in the same breath, on three several occasions. As I shall presently show by quotations, the map and text are in perfect accord as to the position of Frislanda, yet, by way of injurious dislocation, Professor Steenstrup sends the Frislanda of the map to one limbo, and the Frislanda of the text to another.

Messrs. Krarup and Steenstrup have, of course, as much right to assume that the name of Van Siggem was the phonetic equivalent of Zeno's Zichmni as Johann Reinhold Forster, John Pinkerton, and myself, had to assume that said equivalent was supplied by the name of Sinclair. The verification of either assumption must lie in the movements of the assumed personage being in accordance with the time, localities, &c., mentioned in connection with Zichmni in the Zeno narrative. There is no discordance in placing the movements of Henry Sinclair, Earl of Orkney, in the Shetland, Færöe, and Orkney groups. The assumption of the name of Van Siggem, however, entails the transportation of "the Frislanda of the text" to that part of the continental Friesland which is described by M. Krarup as "North Friesland (western parts of the Duchy of Slesvig") and by Professor Steenstrup as "North Friesland or 'Strand' Friesland." The authors of the text, however, Nicolò and Antonio Zeno, were clearly of a very different opinion. In one place their narrative states that "Estlanda (Shetland) lies between Frislanda and Norvegia," and in another that "Zichmni possessed certain islands called Porlanda, lying not far from Frislanda to the south, and beyond the said small islands he was lord, on the mainland, of the duchy of Sorano, lying over against Scotia." In accordance with these two geographical statements, the map places the Shetlands between Frislanda and Norway, while the northern point of Scotia (Scotland) lies south-east of Frislanda, with the other islands intervening. "*The Frislanda of the Zeni narrative*," therefore, lies north-west of the northern point of Scotland. To those accordingly, who, like myself, have never doubted that Norvegia was Norway, and Scotia, Scotland, it followed that "the Frislanda of the Zeno narrative" was, as regards longitude, west of Norway and the Shetlands, and, as regards latitude, north of Scotland, the two positions making the conversion of Scotia into any other country but Scotland as great an absurdity as it would be to tell us that Norvegia was not Norway. Yet this Professor Steenstrup has had the courage to do. Although, both in text and map, Norvegia is found in conjunction with Suecia (Sweden); although on the map it has Dania (Denmark) to the south of it; although it has laid down on its coast "Trondo" for "Trondheim," and down at the south "Bergen," correctly so given; although Engroneland is a great mainland lying opposite to Norvegia, with Islanda lying between them, as Iceland should lie between Greenland and Norway; yet for this gentleman Norvegia is not Norway, nor Scotia, Scotland. Having found a home for Zichmni in North Friesland, he asks the reader to believe that "Norvegia" may well be a misprint for "Norges Harda," and that "Scotia" is "Goesia or Goestia, answering to Goestherde," both in that country, while "Engroneland is a North Frisian marshland, probably the Eiderstedt Peninsula."

The geography is curious, but every one has a right to his own opinion. Let us then take Prof. Steenstrup's geography on its own merits. Frislanda is North Friesland, and Norvegia and Scotia are districts therein. Frislanda, consequently, is much greater than Norvegia, and there is no knowing what it may include in its comprehensive embrace. The Shetland Islands, according to the Zeno narrative, lie between Frislanda and Norvegia. Are they then outside or inside of North Friesland? If outside, which they must be to suit the Zeno geography, then Norvegia must be outside also. Therefore Norvegia is both inside and outside of Frislanda. If, however, the Shetlands are inside of North Friesland, whereabouts are they to be found? But again, Frislanda includes Scotia, and must be much greater than it. Meanwhile the Zeno narrative tells us that the "little islands" which form Porlanda lie south of Frislanda, and between it and Scotia. Are they, then, outside or inside North Friesland? If outside, which they must be to suit the Zeno geography, then Scotia must be outside also. Therefore Scotia is both inside and outside of

Frislanda. If, however, the Porlanda islands are inside of North Friesland, whereabouts are they? Again, Nicolò Zeno went northward from the Shetland Islands to Engroncland, but, according to Professor Steenstrup, "Engroneland is certainly not Greenland, but a North Frisian marshland, probably the Eiderstedt Peninsula." But the latter is the most south-western part of his Friesland: how far to the south then are the poor Shetlands to be looked for? The narrative tells us that "friars resorted to the monastery in Engroneland from Norvegia, Suecia, and other countries." I wonder whether Suecia, which most of us have been in the habit of taking for Sweden, went also with Norvegia into North Friesland. It must be confessed that, in Professor Steenstrup's company, Frislanda has become an uncommonly extensive country. The companionship, however, fails to commend itself to my sympathy on the score of justice and truth. Theories which are equally at variance with the ancient text and with the known geography of to-day, are misleading to the casual reader, and unjust to the Zeno document. Certainly they will not induce me to give up my old belief that Norvegia is Norway; Suecia, Sweden; Scotia, Scotland; Engroneland, Greenland; and that the Færöe Islands, called in old Danish (as Admiral Zahrtmann, himself a Dane, tells us), "Færöisland," and which lie between Greenland and Norway, and north-west of Scotland, are the Frislanda of the Zeno narrative and map.

The real interest of the Zeno document lies in this, that it is the latest in existence, as far as we know, treating of the lost East Colony of Greenland, so anxiously sought for; and it is also the latest, as far as we know, treating of the Norse settlers in North America, and showing from the narrative of a fisherman that they still survived at that period, which was 100 years before Columbus. Mr. Krarup gives it, in English, as his ultimate decision, that "the map of the Zeni is a forgery of the editor's (of 1558) intended to vindicate for the Venetian travellers, the Zeni, the first discovery of America" and that "the Zenis (sic) never visited any part of America." Professor Steenstrup echoes the opinion in other words. If either of these gentlemen had carefully *read* the narrative which they have taken upon themselves so injuriously to criticise, they would have seen that it did not contain one single word of pretension that either Nicolò or Antonio Zeno ever set foot either in Estotiland, or Drogio, or any other part of North America, or that they "explored both the east and west coasts of Greenland." R. H. Major.

The Athabasca District of the Canadian N.W. Territory.

Marseilles, *5th Nov.*, 1883.

Sir,—With regard to the note on p. 646 of the November number of the R.G.S. 'Proceedings,' I may observe that besides the T'altsan Desse of my map, there is another stream, the Thu-ban Desse (Des Seins, or River Round-the-breasts), not far to the east, which is, as suggested, the river spoken of in Sir G. Back's narrative under the name of Thu-wu-desseh. The Thu-ban Desse takes its name from the Great Slave Lake, which is called "Thu-t'ue" or Lake of the Breasts by the Chipewyans, because its eastern part is terminated by two extensive bays, in outline fancifully resembling the female bosom.

The T'altsan Desse (meaning Copper, i. e. Copper-Indians or Yellow-knives River) is known to the French Canadians as Rivière du Rocher, a name of which I did not make mention in my map. "T'altsan Desse" is the Indian name of five different rivers in the more northern parts of the North-western Territory: 1, the Copper River of Hearne; 2, the Copper River of the Bering Sea; 3, an affluent of the Mackenzie; 4, another tributary of the Great Slave Lake, below Fort Rae, on the

northern shore; and finally the one now under notice, which flows into the Great Slave Lake between the Slave River and the Thu-wu-desseh, or Clowey River of Back. But of these five rivers, only the first two are known to Europeans as Copper-mine rivers; the third and fourth bear the name of Copper-Indians or Yellow-knives rivers; and the fifth is the above-mentioned Du Rocher or Rock River of the French Canadians.

With regard to the name of the great northern or Athabascan family of Indians, conventionally written "Tinney" or "Tinne," I should like to make a few observations. The Indian name which, as is well known, means "man" or "men," is rendered according to different dialects, by "Dene" or "Tene," "Dane" or "Tane," "Dune," "Dunie," "Dæna" or "Tæna," "Dnaïne," "Dindjie," &c., but never by "Tinne." All these words are compounded of two short syllables, a formation to which the two *n*'s of "Tinne" would be an obstacle. I fancy there may have been some mistake by the early explorers who confused the substantive "Dene" or "Tene" (man, men) with "ottine" (by elision, 'ttine) which is a participle of the verb "Ostti," meaning "I do," "I make," and also signifying "I stay," "I remain." Thus, "Sel'ottine" is "my kinsmen," literally "those who are doing with me" (*mecum agentes*); "Djian ostti unli ille" means "I am never doing here" (i.e. staying, working, hunting); "Djian ottine" is "those who are doing here" (i.e. the inhabitants of this country); &c. This word "ottine" is never employed separately except as a verb. But, as a suffix, it has become a kind of participial noun, meaning *gens*, *natio*, people (*habitantes*, *manentes*), and must be employed with a noun of location or the name of an animal, as "t'altsan ottine." The relatives of "ottine" in some dialects are "gottine" "kottine," &c., suffixes comparable with the "meork" and "meut" of the Eskimo, or the "gwan" of the Koloshes, &c.

EMILE PETITOT.

REPORT OF THE EVENING MEETINGS, SESSION 1883–84.

First Meeting, 12*th November*, 1883.—The Right Hon. LORD ABERDARE, President, in the Chair.

PRESENTATION.—*W. T. Ansell, Esq.*

ELECTION.—*Richard Bentley, Esq.*

THE PRESIDENT'S ADDRESS ON OPENING THE SESSION.

The PRESIDENT opened the business of the Session with the following Address:—

In the five months which have elapsed since the delivery of my Address at our Annual Meeting the progress of geographical research has been active and fruitful in discoveries, of the full results of which we are as yet only partially informed. Fischer, Thomson, and O'Neill on the eastern coasts of Africa; Flegel, Stanley, and Johnston on its western coasts, have added, and may be said to be daily adding, to our knowledge of countries either wholly unexplored, or, if previously explored, wholly undescribed; the events connected with New Guinea are exciting a keener interest than ever in that vast island, of which with slight and rare exceptions only the outer circumference has been visited; Baron de Nordenskiöld's enterprising expedition to Greenland has effectually negatived the surmised existence of a habitable interior protected by natural barriers from the tyranny of ice and snow; the return of several of the Arctic expeditions has relieved much painful anxiety, and raised hopes, if not of any important addition to our knowledge of those regions, still of interesting contributions to scientific geography; while the picture of daring

adventure and noble hardihood in the extension of knowledge and natural science is, as is but too usual, darkened with apprehensions for the fate of expeditions in distant and perilous seas, or saddened with the catastrophes which have too surely befallen new heroes and martyrs in geographical research.

Our Society, while following with vigilant sympathy the traces of travellers of all countries, is naturally most interested in those expeditions in which they have taken an active part.

In addition to the costly expedition under Mr. Thomson to the eastern shores of Victoria Nyanza and the snow-clad mountains of Eastern Equatorial Africa, we have contributed, either by grants of money or of instruments, to several others, from which we may expect interesting results in the course of the current Session. The last news received of Mr. Thomson are very satisfactory. It will be remembered that about the close of last Session we were informed by telegram from Zanzibar that our adventurous young traveller had met with a check on entering the Masai country to the north-west of Mount Kilimanjaro, a large force of that warlike tribe having gathered to oppose his progress, in consequence it was said of some of them having been killed a short time before by Dr. Fischer's party, which had entered the country by a route quite different from that chosen by Mr. Thomson, and was then, to the great disturbance of his plans and calculations, found to be on the track which he was pursuing, and only a few days ahead of him. Mr. Thomson promptly and prudently beat a retreat, and returned to Taveta, at the south-eastern foot of Kilimanjaro. Here he left his party encamped, and with a few attendants only made a rapid march to the coast at Mombasa in order to replenish his supplies before making a fresh start into the unexplored region. The date of his retreat was the 9th of May; by the 2nd of July he was back again at Taveta, found his caravan nearly intact, and luckily meeting with a large Swahili trading party going in the same direction—at least for some days' march—joined his forces to theirs, and is now believed to be well on his way towards his destination. Meantime Dr. Fischer has returned to the coast. It appears that the German naturalist was making for the renowned Lake Bahringo, first heard of and reported by Captains Speke and Grant, but was prevented by the hostility of the Masai from reaching it, though he got as far as the smaller Lake Naivash, where he stayed some weeks, investigating the natural history of that hitherto unvisited district. He reached Zanzibar safely with his collections in August, and embarked soon after for Hamburg, to render an account of his explorations to the Geographical Society of that city, under whose auspices he undertook his important journey.

Two other expeditions with which the Society is more immediately connected, are that of Mr. O'Neill, Consul at Mozambique, who has already accomplished so much in the wide region, previously a blank on our maps, inland from the Mozambique coast, and who started early in June on an exploration of greater extent than his previous ones, to the rumoured lakes and snow-capped peaks midway between the coast and the southern part of Lake Nyassa; and that of Captain Foot, the newly-appointed British Consul to the Lake Regions, who takes instruments for mapping the new districts which he expects to traverse in the course of his official duties. From both these zealous and able explorers we may expect additions to our knowledge of great interest and value.

Considerable public interest, not wholly scientific, has been manifested during the past few months in the events on the Congo. So far as these relate to political considerations, they lie outside our domain, but the proceedings of Stanley and other explorers have lately added greatly to our geographical and ethnological knowledge of the basin of this great river; and some of the discoveries, which have not hitherto been fully made public, are of high interest and importance. We owe our knowledge

of these chiefly to Mr. H. H. Johnston, who visited Mr. Stanley's station on the Congo, early in the summer on his return from the river Cunéné, whither he had accompanied Lord Mayo, and who has contributed during the vacation a paper giving a preliminary outline of his journey to our 'Proceedings.' As we are about to hear from Mr. Johnston's own lips a fuller account of his observations on that region, I will not anticipate him by saying anything further on the subject. But, before quitting this part of Africa, I will venture to predict that, interesting and important as are the recent additions to our knowledge in the Congo basin, we are likely to hear before long of others not less so. Mr. Johnston himself is preparing to return to the Congo and to conduct an expedition up the Aruwimi, its great northern tributary, towards the rumoured new Central African lake, and the waters of the Upper Nile; and we hear from Germany, that Dr. Flegel, the experienced Niger traveller, has accepted a grant of 2000*l.* from the German African Society to enable him to traverse the wide region at present quite unknown between the Binue and Adamawa and the northern bend of the Congo. Dr. Flegel on a recent journey discovered the sources of the Binue, and is reported to have started on his new undertaking with confidence of success.

The exploration of New Guinea is a subject which has also excited a large and growing amount of public interest in the interval since our last meeting. The paper by Mr. Powell to which you listened last Session, must have made evident to you the scantiness of our knowledge of this great island. The coast-line and its off-lying islands he showed to be very imperfectly known, and, with regard to the interior, his exploration, during a cruise lasting eighteen months along a thousand miles of coast, was limited to an inland climb of a few miles during a day's excursion. Other travellers on the same parts of the coast, including M. Miklukho-Maclay, the celebrated Russian ethnologist, who spent many months alone with the natives in Astrolabe Bay, have not accomplished much more. In the southern and western parts of the island, the utmost extent of exploration into the interior, by land, has been in the neighbourhood of Port Moresby, where Mr. Lawes and other agents of the London Missionary Society, who have happily gained the confidence of the natives, appear not to have penetrated more than 30 miles inland. Dr. A. B. Meyer, the German naturalist, one of the most enterprising of New Guinea travellers, endeavoured in 1873, with faithful native companions, to cross the isthmus between the main island and the north-western peninsula, but was able, after two attempts, to penetrate only about ten miles. He afterwards crossed the minor isthmus from sea to sea, between Geelvink Bay and MacCluer Inlet, a somewhat longer distance; and some of his party, as well as Signor D'Albertis in the previous year, reached the Mount Arfak range in the north of the peninsula. The interior, in fact, has been penetrated to any considerable distance only along the course of rivers. Signor D'Albertis, in his ascent of the Fly River in 1876, estimated the distance travelled at 500 miles; but except for the first 100 miles or a little more, his little steamer voyaged between two lofty walls of forest, rising from level alluvial banks apparently destitute of inhabitants, and beyond the course of the stream little or nothing was added to our knowledge of the country. If the descriptions of Dr. Meyer in the north-west, and those of Mr. Lawes and Lieutenant Armit * in the south-east, are to be taken as generally characteristic

* The leader of an expedition sent this summer to explore the interior by the proprietors of the Melbourne *Argus*. Lieutenant Armit and his party entered at Port Moresby and crossed Mount Astrolabe, reaching, as it appears, the furthest point attained by the agents of the London Missionary Society, i. e. some 25 or 30 miles inland. The expedition broke down through fever, which attacked several of its members.

of the country, it is, except in the densely wooded valleys of the great rivers, most rugged and difficult to traverse; immediately from the coast the routes lead by abrupt ascents and descents over the minor hills, and a little further in the interior ridges and peaks are seen rising, in some parts to 10,000 feet or more, as far as the eye can reach. On the north-eastern coast, Mr. Powell, as you will remember, described the country as rising almost immediately from the sea, by a series of steep ascents and terraces, to plateaux of great elevation, which in the place visited were cleft by a deep defile. The population is numerous in the river deltas, and on the small tracts of flat swampy land near the coasts, but appears to be generally scanty in the hills, and the tribes in many localities have shown a determined hostility to Europeans. The traveller has to carry his provisions in addition to all his other baggage, and the means of transport for a long journey are at present wanting, there being no beasts of burden or native porters that can be relied on.

Such are the obstacles to exploration which must suggest themselves to any one who reads the accounts of the few travellers who have attempted journeys by land; but they are not likely to deter the adventurous and indomitable explorers of the present generation, for whom the large rivers offer inviting openings; we may soon, therefore, expect to hear of many projects of New Guinea expeditions, some of them animated by other hopes and aspirations than those of the geographical traveller.

With the desire to secure a well-directed scientific exploration of the interior, the British Association at their recent meeting at Southport appointed a Committee to confer with the Council of the Association as to the best means of attaining that object. Now that our Society has reassembled no time will be lost in giving joint consideration to this interesting subject. It seems before all things desirable that knowledge, full and trustworthy, unbiassed by commercial speculations and visions of territorial aggrandisement, should be acquired and disseminated with the least possible delay; and I venture to think that this knowledge, which ought to precede any decisive action either by the Imperial or Colonial Governments, could be most effectually obtained by purely scientific exploration—directed, as further consideration may suggest, on one or more lines of advance. To act in ignorance either of the character of the people to be encountered or of the country to be colonised, seems not only the height of rashness, but a course which may gravely affect the fair fame of England, and bring shame upon those who value her reputation, while it will confirm much that our bitterest enemies have said of our insatiable greed of territory, and of the high-handed and remorseless fashion in which we gratify that passion.

What Mr. Powell told us of the few tribes with which he came into contact, conveyed the impression of a people jealous of their personal independence, and keenly alive to the rights of property. Let us learn more about them, and not fall back upon the plea of ignorance to justify national indifference to the violation of their rights or the sacrifice of their lives. Burke has painted in colours which never can fade, the picture of a civilised people bent, without due restraint and control, upon making rapid fortunes at the cost of a subject and weaker race:—"Animated with all the avarice of age, and all the impetuosity of youth, they roll in one after the other; wave after wave; and there is nothing before the eyes of the natives but an endless, hopeless prospect of new flights of birds of prey and passage, with appetites continually renewing for a food that is continually wasting." We boast of living in an age in which consciences are more sensitive, and in which there prevails a greater regard for the rights of others than in the past. I trust that our conduct as a people with respect to this vast island, with its unknown millions of inhabitants, may justify the boast. But again I say, let there be more light,

before we commit ourselves to decisive action; and let that light be the clear calm illumination of scientific research. With so important an object before us, we may indulge a sanguine hope of receiving the sympathy and assistance of Government.

Explorations in one region or another of the great continent of Asia are continually in progress, and it would be impossible in this brief outline to notice them in detail. The remarkable journey of the Pundit A——k from India across South-eastern Tibet to Western China and back, which has during our recess been frequently noticed in the daily press, was recorded as fully as official reticence in India permitted in our 'Proceedings' for February, and referred to in your Annual Address in May. The most important, however, of all recent expeditions in Central Asia are that of Mr. M'Nair, who has succeeded in crossing into Chitral and the Swat Valley, and who will give us an account of his adventurous journey at our December meeting; and the new exploration of Colonel Prejevalsky, who started in August last with a large and well-equipped party to make his third and, as he hopes, his most successful attempt to explore the whole of Tibet. Colonel Prejevalsky is, as is well known, an accomplished naturalist and physical geographer, and rich scientific results may fairly be expected from this expedition.

I must not conclude without some references to recent Arctic expeditions. We have witnessed with pleasure the safe return of several of the expeditions which have wintered in remote regions. Two among them, the Dutch expedition in the *Varna* on its way to found a station at the mouth of the Yenisei, and the Danish expedition under Lieutenant Hovgaard, in the *Dijmphna*, were, on their outward voyage in the autumn of 1882, caught in the ice in the Kara Sea and imprisoned for the winter. The *Varna* was crushed by ice pressure in the course of the winter (December 24th), and sank in July, the Dutch scientific staff and crew taking refuge on board the Danish vessel. Happily both parties have returned safely this summer. The Austro-Hungarian party, which wintered in Jan Mayen, have also returned after a satisfactory winter's work, and the Swedish and German expeditions in similar way have been brought safely home. An exception to the happy issue of these various national scientific enterprises in the Arctic Sea, is to be feared in the large party sent by the United States Government to Lady Franklin Bay in Smith Sound in the summer of 1881. This party consisted of twenty-four officers and men, chiefly of the signal service of the United States Army, under the command of Lieutenant Greely. The summer of 1881 was an exceptionally mild one in Arctic America, and the vessel conveying the party had a swift and pleasant run up Smith Sound from Upernivik; but the two following summers, 1882 and 1883, were cold and boisterous; and relief ships sent by the United States Government have failed to penetrate into Smith Sound. The vessel, the *Proteus*, sent this year for the purpose of bringing them away, was crushed in the ice and wrecked on the 23rd of July, the crew escaping with difficulty to another vessel, the *Yantic*, at Cape York.

There is much reason to fear that some disaster has befallen these gallant men, and that some of them have perished during their prolonged detention in that most rigorous portion of the Polar regions. Such a fate, happening to any people, would be certain to evoke our warm regrets; but the feeling is heightened when we remember with how keen a sympathy the American people have ever followed the disasters of British adventurers in Arctic seas; and how generous and untiring have been their efforts to carry relief to the sufferers, as long as the slightest chance remained of their being still in the land of the living.

A more fortunate fate attended the expedition of Baron de Nordenskiöld this summer to Greenland, undertaken with the intention of penetrating to the interior of that vast ice-clad country. Although the eminent Arctic explorer did not discover what theoretical considerations had led him to expect, a comparatively

temperate region in the interior, his land parties succeeded in penetrating 230 miles inland, finding the land rising from 6000 and 7000 feet of elevation, and everywhere covered with ice. Thus this illustrious traveller has once more made a valuable contribution to our knowledge of unknown northern regions, not only by clearing away doubtful surmises, but by establishing interesting facts.

In closing my brief review of the chief events of geographical interest during the few months which separate us from our last Annual Meeting, I would conclude by asking whether both by the additions they have made to our actual knowledge, and the prospects they present of new light dawning on many dark regions of vast extent and high interest, ample proof is not adduced of the immense field which still remains in various parts of the globe, to stimulate the activity and reward the enterprise of well-accoutred travellers, capable of gratifying the learned curiosity of a more exacting and critical age?

During our recess we have suffered the loss of an eminent Arctic navigator, Vice-Admiral Sir Richard Collinson, K.C.B. During his long connection with this Society, he took a large and active part in its affairs, having served either as Vice-President or as a Member of Council for eighteen years, working indefatigably on several of our Committees. I cannot deny myself the pleasure of making some reference to his full and active career, which made him so useful a member of our Society. He may be said to have been an hydrographer from his youth, for he entered the Royal Navy at twelve years old, and five years afterwards, in 1828, he was a midshipman on board the *Chanticleer*, on its voyage of scientific research in the Atlantic and Pacific; it was here, under Captain Foster, that he imbibed his tastes and habits of nautical surveying. Again, in 1835, when a lieutenant, he was in the surveying expedition of the *Sulphur* and *Starling*, under Captain Beechey in the Pacific Ocean.

He had by that time gained the esteem and friendship of that able chief of the Hydrographic Department, Captain Beaufort; and through his influence, at the outbreak of the Chinese war of 1841, Lieutenant Collinson was appointed Surveying Officer to the fleet. The duties of this position, at that time a somewhat novel one, involved frequently great responsibilities, and called into prompt action not only all the best qualities of a naval surveyor, but those of a bold and able war officer. The record of his services in that position belongs rather to the history of the war, than to the proceedings of the Geographical Society; it is sufficient to notice here that in concert with his friend Captain H. Kellet, who, in the *Starling*, had opportunely arrived with the surveying expedition from the Pacific, the fleet was successfully piloted into many of the unknown waters of China; the chief exploit being the penetration of the war ships up the Yang-tse-Kiang, to the unprecedented distance of 200 miles. For these services Lieutenant Collinson came out of the war a post-captain and a C.B.

It is more interesting to geographical science to note that after the war, Captain Collinson in the *Plover*, assisted by Lieutenant Bate in the *Young Hebe*, devoted three years to the survey of the Chinese coast from Hong Kong to Chusan; making those charts which have been the guides to the immense maritime traffic since opened up in those seas.

But the work for which he will perhaps be longest known in the geographical annals was accomplished in command of the *Enterprise* and the *Investigator* in search of Sir John Franklin's unfortunate expedition in the Arctic Seas. In January 1850 those two vessels left England, traversed the Atlantic and Pacific oceans, and entered the Arctic Sea by Behring's Straits. The story of their successes and of their failures has been fully recorded in the Journals of the Society, where it is told how the vessels were separated, and how Captain Maclure in the *Investigator* discovered

the North-west Passage, but paid the penalty of his ambition in the sacrifice of his ship; how the *Enterprise* spent three years and more battling her way eastward along the coast of North America, and got almost within sight of the spot where after three more anxious years the relics of the lost expedition were finally found by Captain M'Clintock, a good fortune which was denied to the *Enterprise* owing to a series of unavoidable mishaps; and how after this protracted warfare with ice and with disappointed hopes she fought her way out again, with ship and crew in sound condition, having added greatly to our knowledge of that little-known coast, as well as of many other places visited by her in the course of her five and a half years' sailing in the open seas.

Since that time Admiral Collinson has been employed on a service kindred to the purposes of the Society, and suited to his hydrographic abilities, in the Corporation of the Trinity House, of which he has been a prominent member, and latterly the managing head. Throughout all his services, whether in the Chinese war, or Arctic exploration, or looking after the safe navigation of our coasts, he has evinced the qualities which go to make a good maritime explorer as well as an honest and devoted servant of his queen and country.

M. de Lesseps.

After introducing to the Meeting Mr. H. H. Johnston, the author of the paper about to be read, the President announced the presence as a visitor that evening of M. Ferdinand de Lesseps. He said he was quite sure that no one present would be satisfied unless he made some reference to their distinguished guest. M. de Lesseps would be entitled to a warm recognition in virtue of his position as President of the Geographical Society of Paris, but he was also known as one who had done much to promote geographical research. Apart from those great enterprises which had more of commercial than geographical interest, he had set on foot remarkable projects on the south-eastern coast of Tunis, with the object of letting the waters of the Mediterranean into a portion of the Sahara. But perhaps it was not so generally known that one of the first persons of eminence who took up the admirable scheme of the King of the Belgians, called the African International Association for promoting discovery and founding nuclei of civilisation in that continent, and at the same time excluding those national jealousies and rivalries which had often done so much harm, was M. de Lesseps. He responded most cordially to the invitation of the King of the Belgians, and it was through his instrumentality that M. de Brazza commenced those remarkable discoveries on the Ogowé which made his name famous long before more recent events of other than geographical interest on the banks of the Congo. But great as these services were, every one would agree that they were small as compared with what he had done for the whole civilised world. All were familiar with the hyperbolical language of the enamoured youth who wished that time and space might be annihilated to make two lovers happy. Time and space were two obstinate things, and would not be annihilated; but M. de Lesseps had gone a great way in reducing the obstacles caused by space and adding enormously to the value of time; and all present would be delighted to find that time, for which he had done so much, had respected him so well, and that with all the experience and the hoarded knowledge of age he had the fire of youth—an amount of fire which might make many a young man ashamed of himself. They hoped that M. de Lesseps would yet enjoy many "crowded hours of glorious life," and that during the time it was permitted him to remain upon earth he would perform as many services, not to his own country alone, but to the whole civilised world, as he had been able to render in the years gone by. In saying this he was sure he only represented, however weakly, the feelings with which they were all animated towards M. de Lesseps.

M. de Lesseps asked permission to say a few words:—First thanking the President for the kind manner in which he had announced his presence on that occasion, he said that some twenty-seven years ago he was present at a meeting of the Royal Geographical Society at which an English traveller had introduced a project for uniting the Atlantic and Pacific oceans by the river Atrato, in New Granada. It was remarkable that in all the early schemes for joining the Mediterranean with the Red Sea, or the Pacific with the Atlantic, it was a union by means of the rivers only that was entertained. The engineers had not thought of uniting sea to sea by cutting through the land. It remained for a diplomatist to conceive this very simple idea, and although people had spoken of him as an engineer, he must disavow all claim to that honourable title. Since the year 1849, when he gave up political life, he had employed his leisure in studying the question of the piercing of isthmuses, and he congratulated himself in the presence of an English audience in having been useful to a friendly nation. He had now come to England in order to dissipate regretable misunderstandings, and to prove to Englishmen his desire to augment the prosperity of their country.

The following paper was then read:—

"The River Congo, from its mouth to Bólóbó, with Notes on the Physical Geography, Resources, and Prospects of the Congo Basin." By H. H. Johnston.

Vide ante, p. 692.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—November 9th, 1883: M. Bouquet de la Grye, Vice-President of the Central Commission, in the Chair.—The Society on the above date recommenced its meetings, which owing to the usual vacation, had not been held since the latter end of July. Among the numerous letters, pamphlets, &c., which had accumulated during the recess the following works were mentioned as bearing on the topic of the day in France—'Les Français au Tong King,' by M. H. Gautier; 'Le Tong King,' by M. Thureau; a pamphlet entitled 'La Guerre avec la Chine; la politique coloniale et la question du Tong King'; 'Les Gisements houillers du Tong King,' a report by M. Fuchs to the Minister of Public Works; and 'La Cochinchine contemporaine,' by MM. Bouinais and Paulus.—The Minister of Public Works transmitted the sheets composing the 4th and 5th parts of the map of France, scale 1:1,200,000. M. Tafiropoulo presented to the Society the map of the Byzantine Empire, which he has had prepared for the schools of Greece by Kiepert, the learned geographer. This map, together with the three others already published, completes the series of maps of Greece from the fifth century up to the present time. M. Barrère, Lieutenant of the 61st regiment (infantry) tendered to the Society an album containing surveys of the various itineraries made in Tunis during the campaign of 1881–2 by the expedition of which he formed part, he having been commissioned to make such surveys. This work is not on sale.—The Chairman then announced the death of M. Guyot, the courageous French missionary, who was drowned in the Congo near Stanley Pool, and that of M. Trouillet, who also met his death on the Congo, an account of which will be found below. M. Bouquet de la Grye intimated that M. Dutreuil du Rhins, who followed M. de Brazza and had returned home some weeks previously, was present at the meeting. In reply to questions concerning M. de Brazza and especially on the subject of the reported death of the explorer, which was alleged to have taken place on the banks of the Congo, M. du Rhins said that, according to his calculations, M. de Brazza was not due at the Congo until the beginning of October and that, supposing his death to have occurred in the manner reported, the news could not possibly have as yet arrived in Europe. M. du Rhins

had parted company with the explorer on the 5th of July last, at a point 373 miles (600 kilometres) distant from the coast; all was well at that time. M. de Brazza, in reascending the Ogowé, had given proofs of his usual activity. M. du Rhins did not make any further observations, being unwilling to trespass upon the report which M. de Brazza would address to the Minister of the Navy upon his present journey. The country traversed by M. du Rhins extends from Gaboon to Lambarena, and the whole of the district appeared to him suitable for the cultivation of the sugar-cane, indiarubber plant, and oil-yielding palm. The other productions of the country are, it appears, only local, and offer no prospects for an extensive and remunerative export trade; moreover it would be necessary to construct roads. He wished it to be understood, however, that in the foregoing calculation an exception is made in favour of ivory, and also the redwood and other species which are useful for the construction of boats, cabins, and woodwork of various kinds.—A letter was received from Major-General Michael Venukoff, stating the chief facts in connection with the geographical movements in Russia during the last four months. The correspondent announces the following publications: a good map of the existing roads of Russia in Europe, which is published by the Government; the first volume of a comprehensive work on Turcomania, by General Grodekoff; an account of the voyage of M. Poliakoff to Saghalien Island, where he stayed for thirteen months (1881–2). The large map of Bulgaria has been continued by the War Office at St. Petersburg, and M. Lessar, it appears, read before the Geographical Society of that city a summarised account of his explorations (this report has not yet been printed). The letter states that the commander of the meteorological station in Novaya Zemlya had returned, but that the members of the station at the mouth of the Lena will remain at their post for another winter.—An editor of the 'Geographische Mittheilungen' writes to the Society advising the publication of biographical notices of travellers and French geographers, similar to those which appear in the 'Proceedings' of the Royal Geographical Society of London and are, he adds, an excellent source of information.—With reference to the recent earthquakes, Dr. Fr. Delisle, in a letter addressed to the Society, establishes a correlation between the disastrous earthquake which occurred in the Straits of Sunda, and the shocks experienced on the 27th August in the Islands of Mauritius and Reunion. Concerning the appalling catastrophe of the Sunda Straits, M. de la Croix, an engineer and companion of M. Brau de St. Pol Lias, wrote from Lahat on the 29th September, giving an account of the eruption of the volcano of Krakatoa, the detonations of which he himself distinctly heard. They seemed to him to be like the shots of a gun discharged some two or three miles away, whereas Lahat is situated at a distance of 746 miles (1200 kilometres) from the volcano. At the time of writing, our correspondent was entertaining as a guest the Governor-General of the Straits Settlements, who had come to christen a new machine to be used for the mining operations which M. De la Croix is directing.—M. Brau De St. Pol Lias completed the details given in the foregoing letter. He presented first of all to the Society a drawing representing the section in elevation of the Straits of Sunda, which gives a very clear idea of the scene of the event. This unpublished, or at least unengraved, plan forms part of the work—unfortunately not completed—of a commission sent to the Indies in 1825 by the Dutch Government, which for some 10 or 12 years explored the islands of Java, Sumatra, Borneo, Timor, &c. It was upon the coast of Sumatra that the most singular phenomena were produced by the earthquake. Thus Tolok-Betoung since the catastrophe is no longer a seaport. M. Brau informs us that there is at the entrance a barrier, composed of pumice-stone, 19 miles in length, two-thirds of a mile or more in breadth, and from 13 to 16 feet in depth. This barrier is not stationary, but is a kind of floating jetty, which rises about 3 feet above the surface of the water. The volcano

has, therefore, hurled to a distance of 25 miles (40 kilometres) some 5,000,000,000 cubic feet of projectiles, unless it is the wave which has carried the mass there. A captain, who was going through the Straits on that day (27th August), relates that his ship was found in a moment in the midst of such a mass of human bodies floating on the surface of the waves, that his onward progress was considerably impeded; it was passing through literally a shoal of corpses. However, as usually happens in similar circumstances, the number of the victims has been grossly exaggerated. The official figure would appear to be 15,000, according to information furnished to M. Brau by the Minister of the Dutch Colonies himself.—News was received from M. Georges Révoil,* who is engaged upon a mission to the Somali country. The letter which he wrote from Gualidi, on the Ouebi, on the 18th of September, arrived, accompanied by a much more detailed report, drawn up by his brother, M. Paul Révoil. The traveller, it appears, having left Zanzibar at the beginning of May last, arrived on the 14th at Mogadoxo, where he remained until the 24th or 25th of June. A march of some six or seven hours only separated him from Gualidi, where he arrived the same evening, but he was compelled to stop there three months, the Sultan, Omar Yusuf, dilly-dallying with promises. The Somali town of Gualidi, on the Ouebi-Doboï, which is barely 100 feet (30 metres) broad, is divided into six districts, situated on both sides of the river, but some of them are rather far removed from the others. The Somalis of this region are less warlike than those of Guardafui but are more crafty, rapacious, and perhaps more cruel, than the latter. On the 19th of September M. Révoil was still at Gualidi, whence he was hoping to depart about the 25th, in order to reach Gananeh, some twenty or thirty days' march from Gualidi. His intention was to proceed from there to the country of the Gallas, and thence to reach the coast of the Gulf of Aden viâ Harrar.—M. Thouar forwarded an account of the manners and customs of the Chiriguano Indians, which will be inserted in the report of the meetings.—A letter was read from M. Claude Trouillet, dated from Bouba (Portuguese Guinea, West Africa), where the author happened to be about the middle of June last, having journeyed from Boulam (Bissagos Archipelago), an island which is described in one of his previous letters.† The town of Bouba is situated on the left bank of the Rio Grande, which, according to our correspondent, is a magnificent river, its banks being clothed with a superb vegetation; indeed one might fancy it was a charming lake, with its tranquil waters, and the gentle murmur of its wavelets mingling with the song of the turtle-doves. Bouba itself might, according to the correspondent, be made an important commercial centre, but Portugal is too poor to give sufficient support to her colonies. Moreover, this military station has only four houses, viz. that of the governor and three commercial establishments, two of which were closed at the time of the traveller's visit. The soldiers are natives. In the neighbourhood of the place M. Trouillet came upon some ants' nests, which in some instances measure several yards in height and breadth. At the time of writing he was engaged in acquiring the Futa-Djallon language which, as it does not exist in any written form, is regulated solely by custom. It was announced that since receiving the letter above referred to, M. Trouillet had died, having fallen a victim to fever. A telegram received from the Geographical Society of Lisbon announced his death, the touching details of which form the subject of a letter from M. Alex. Prins, one of his companions, which is dated 2nd August from Bouba. From this we learn that the Portuguese were most assiduous in their attentions to M. Trouillet, who died in the arms of the governor. The latter was the chief mourner, and the hundred men composing the garrison were present at the

* *Antea*, p. 717.

† See *antea*, pp. 558–9.

funeral. The body, which was borne to the grave by Portuguese officers, was laid in a padded coffin, with the head resting on a cushion upon which the arms of Portugal were emblazoned.—The recent despatches received from Dr. Bayol, and dated from Balfulabé June 17th, were submitted to the Meeting. They give a *résumé* of the results of the explorations, undertaken by him in conjunction with M. Quinquandon, a lieutenant of the marine infantry. Having started from Bamako on the 16th of April, the French mission traversed a hitherto unexplored tract of country lying between the left bank of the Niger and the route followed by M. Lenz on his return to Senegal. The extreme point reached by the travellers was Donabugu, on the east of Murdia. All the country as far as Segala has been placed under the protectorate of France. The existing map of these districts will have to be considerably altered, the explorers having surveyed more than 224 miles (360 kilometres) of new country. Moreover M. Quinquandon, from information he has obtained, has been enabled to determine the positions of some 300 villages outside the actual line of route. The population of the country is stated to be very numerous, consisting of Bambaras, Sarracolets, and Toucouleurs. Among the important towns, Dr. Bayol mentions Murdia, which is a place of considerable trade, and numbers some 2500 inhabitants. From there come caravans to exchange blocks of salt for gold, slaves, &c. Among others he notices Gombu (4500 souls), whose commercial importance is on the wane, and Sokolo (Sualo or rather Kala) with its 3000 inhabitants. From Kala to Segala it is two days' march, and from Kala to Timbuctu four days. The route to this famous market (Timbuctu) has been obstinately closed against travellers, but Dr. Bayol states that the importance of the place has been greatly exaggerated.—From a Report of M. Ledoulx, French Consul at Zanzibar, which was received through the Minister of Foreign Affairs, it appears that the French missions at Monoha and Maudera are in a highly prosperous condition. Villages have sprung up around them, which are daily becoming more important. The various productions of the surrounding districts are flowing in, money is beginning to take the place of exchange there, and there are already indications that the time is not far distant when populous centres will be flourishing, where formerly brushwood and solitude reigned supreme.—Two communications were received from M. A. Thouar, who is devoting himself to the discovery of the remains of Dr. Crevaux and his unfortunate companions. In the one, dated 27th June from Tarija, he announces the departure of a battalion, composed of 150 foot and 50 horse soldiers, which the Bolivian Government had despatched to occupy Teyo. The leadership of the scientific part of the expedition was offered to M. Thouar, but he declined, being desirous of preserving his independent character. War to the knife has been declared against the Tobas. M. Thouar was counting on accompanying the military expedition as far as possible, his intention in the interim being to survey the course of the Pilcomayo river from San Francisco, to make numerous soundings, and to pursue his researches as to the existence of the river Guayra, which, according to the Jesuit fathers, is an affluent of the Pilcomayo, communicating with the Vermejo. The correspondent further states that the fathers of the convent at Tarija have published an account of the exploration of the Crevaux Mission. This account, which contains many interesting details, M. Thouar hopes to communicate to the Society on his return. The second letter is dated 1st August from Cäiza (North Grand Chaco), where the traveller arrived on the 21st of July. There he had reason to be convinced that there were two survivors of the Crevaux Mission, and that they were detained as prisoners by either the Tobas or the Chorotis. Various articles connected with the ill-fated expedition have been obtained by M. Thouar, and among others a sketch of the course of the Pilcomayo as far as Asuncion. The draft is in pencil, and annotated by the late M. Billet, one of the companions of Crevaux. On

the 6th or 10th of August M. Thouar was to start for Teyo, in order to continue his researches; he was afterwards going to traverse the whole of Northern Chaco along the left bank of the Pilcomayo, and he hoped to return to Asuncion about the 15th of September.—Another French traveller, M. Marguin of Buenos Ayres, is pursuing the same object as M. Thouar, and the French Chargé d'Affaires of that city has written to the Minister of Public Instruction at Paris asking for a grant of 400*l.* (10,000 francs) to enable M. Marguin to explore the Pilcomayo.—M. Alph. Milne-Edwards, Member of the Institute and Professor of the Natural History Museum, announced that the results obtained during the scientific expedition of the *Talisman* in the Atlantic Ocean were very satisfactory. As regards zoology, the mission had been very prolific of results, and according to the report has made some "marvellous" discoveries. Nearly two hundred soundings have been executed at great depths, and throughout the whole of the region traversed samples of the depth of the ocean have been obtained. These soundings are the more interesting as they rectify in many cases those which are indicated upon existing maps. As regards the bathymetrical map, published under German authority in a recent atlas, M. Milne-Edwards states that it is purely a work of the imagination; the curves therein indicated do not correspond in any way with the real relief of the Atlantic. In one place where the map marks 3000 fathoms, the expedition has found 6000; again, the sounding-lead descended 3000 fathoms at points where the map showed 1000 only. The bottom of the Sargasso Sea, which is 3280 fathoms deep (6000 metres), is entirely volcanic, and from it the mission has made a collection of lava and scoriæ, some pieces of which appear to be of comparatively recent origin; this fact accounts for the poverty of the submarine fauna. The island of Branco, on which no naturalist had ever landed, was studied with great care. The explorers discovered there great lizards, which are not found in any other part, herbivorous animals, although the vegetation of the island is almost nil. The approaches of the island are, it appears, most difficult, on account of rocks and surf. The immense submarine volcanic belt, of the existence of which M. Milne-Edwards informs us, has its culminating points at the Cape Verd, Canary, and Azores islands. This chain, which runs parallel with the Andes range in America, extends perhaps as far north as Iceland. Whether this is so or not is a question which rests with the commander of the expedition, and which will be a matter for future study.—The French Consul at Melbourne informed the Society by letter of the initiative taken by two Australian newspapers, the *Age* and the *Argus*, of that city, with a view of promoting the scheme for the annexation of New Guinea, or at least of all that portion not at present occupied by the Dutch, which has been put forward by the colony of Queensland, but not, or at least not at present, ratified by the English Government. The first-named of these newspapers has charged M. G. E. Morrison with a mission of exploration in the island of New Guinea, which is still so little known. This gentleman has already accomplished a journey on foot of nearly 700 leagues across the Australian continent from the Gulf of Carpentaria to Melbourne. Not to be behind its contemporary, the *Argus*, which is the most influential paper in the whole of Australia, has in its turn commissioned Lieut. Armit, late captain of the Queensland Native Police, a learned botanist and a man of profound knowledge of the Polynesian races, to make a thorough and exhaustive exploration of New Guinea, of which he will be expected to give a complete description, including the fauna, flora, and mineral and other resources of the island, &c.—The Governor of Cochin China transmitted to the Society a letter from M. E. Aymonier, Governor of Cambodia, who is engaged upon a scientific mission. In this communication the latter announces his arrival in May last at Krachêb, which is situated in Cambodian territory, and below the last rapids of the Mekong or Great River. Having completed an exploration of the two pro-

vinces of Thbang-Kermum and Ba-Phnom, it was his intention to visit Chaudoc early in June, where he reckoned to spend several weeks in classifying the epigraphical collections which he had made. On his return to Saigon in July he intended to proceed to the north of the province of Bin-thuan at the extreme end of the Bay of Padaran, in order to gain there accurate information relative to the state of the ancient kingdom of Ciampa.—M. Marin Darbel, naval lieutenant on board the *D'Estrées*, forwarded an account of the visit made to the island of Vanikoro by the French despatch-boat *Le Bruat* (Captain Bénier); the account is printed in the *Monitor of New Caledonia*. Since the publication of this report (3rd August, 1883), the island of Vanikoro has been again visited by *Le Bruat*, and M. Bénier had the good fortune to secure from the spot, where one of the ships of the illustrious La Pérouse was wrecked, three great anchors, two cast-iron guns, a portion of a third gun, three pump-bodies, and a bronze rake. These débris were found imbedded under masses of coral.—Announcement was made of the return to France of M. Ch. Huber, who has been to Palmyra for the purpose of obtaining impressions of certain inscriptions, of which one of the Sections of the Institute, viz. the Academy of Inscriptions and Literature, desired to have copies. The French consul at Damascus, M. P. Gilbert, who is a member of the Society, interceded to obtain for M. Huber the necessary authority.—With regard to the question of a Universal Meridian, M. Gustave d'Eichthal writes that it is to be regretted that the Greenwich meridian adopted by the Geodesical Congress at Rome has no relation to the ancient division of the globe into eastern and western hemispheres, a division founded alike on the history of humanity and even on the conformation of the terrestrial surface, which has influenced historical development so strongly. The line of demarcation between the east and west, although vague and unsettled, having always been considered as passing somewhere near the centre of the Mediterranean, M. d'Eichthal asks that, if it should be found impossible to adopt Sicily or Lower Italy as the place through which to pass the meridian, it should be a point the distance of which from the Greenwich meridian should be a whole number. Mr. Parker Snow returns to his project for the establishment of the first meridian at St. Paul's Rocks in the Atlantic, as he does not believe that England will permanently maintain the 1st meridian of Greenwich.—In another communication, dated from Saigon and addressed direct to the Society, Captain Aymonier gives an account of his recent excursion to Cambodia, which lasted seven months, viz. from December 1882 to June 1883. He has collected together nearly two hundred inscriptions, which he has stamped, and these, with those which he had previously got together, will throw an important light on the past history of Cambodia, although those he has recently obtained are especially of a too exclusively religious character. On the mountain of Koulen, a solid mass of sandstone, from 650 to 1000 feet high and from five to six miles broad, the traveller discovered several inscriptions, presenting for the first time this peculiarity, of being engraved in the rock itself.—In conclusion, a communication was made by M. Charles Rabot upon his recent journey in Lapland, as well as upon the Nordenskiöld Expedition to Greenland.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Ackermann [Dr.] Carl.—Beiträge zur physischen Geographie der Ostsee. Hamburg (Otto Meissner): 1883, squ. 8vo., pp. x. and 399, map and tables. (*Dulau*: price 10*s*.)

This monographic treatise, which Dr. Ackermann modestly calls "contributions" on the physical geography of the Baltic, is divided into four sections:—(1) Morphological, describing the limits of that sea, its entrance-depths, and its western and eastern portions bathymetrically treated; (2) Geological, subdivided under the effects of water and of secular elevations and depressions; (3) Physical, under the heads of conditions of sea and air currents and their respective effects, and of temperature; (4) Biological, discussing the fauna and flora, and also various organisms influenced by the Baltic, though not living within its proper boundaries.

The tables are (1) bathymetrical, (2–4) showing isotherms for the year, winter and summer, &c., and (5) the year's deep-water temperatures. The map (scale 1:3,000,000) shows depths by colour for the whole Baltic, with various insets on smaller and larger scales.

ASIA.

[Caucasus.]—Notes on the Caucasus. By Wanderer. London (Macmillan): 1883, 8vo., pp. 280 [no index]. Price 9*s*.

This anonymous sketch, apparently written by a former resident in Tiflis, is chiefly devoted to a description of military events in the Caucasus during the last Russo-Turkish war and of the corruption and license both of the present rulers and the majority of the native races. There are, however, various observations of interest on topography, climate, products, fauna (as regards game), &c.

Conder, Claude Reignier.—Heth and Moab. Explorations in Syria in 1881 and 1882. Published for the Committee of the Palestine Exploration Fund. London (Richard Bentley & Son): 1883, 8vo., pp. x. and 436, map and illustrations. Price 14*s*.

This volume contains the more popular results of Captain Conder's short campaign for the survey of Palestine east of the Jordan, which was first interrupted by fighting among the Druses and subsequently stopped by order of Turkish officials. While waiting for the arrival of his instruments and surveyors, Captain Conder utilised the time by making a journey north from Beyrut in search of the long-lost Kadesh, the city of the Hittites. This is identified (after Thomson) as Kades, a name found to be well known as applying to ruins on the south slope of Tell Neby Mendeh (or Mendau), on the west bank of the Orontes, near the southern end of Lake Koteineh. The special object of the expedition was commenced by way of Moab, and some 500 miles of the southern part, from the north-eastern shores of the Dead Sea to Rabbath-Ammon, were actually surveyed while the author was being forced out of the country.

In the appendix the author gives (among other things) a Scripture Gazetteer of Eastern Palestine (Bashan, Gilead, and Moab), containing 97 names, of which 30 are now for the first time identified; also observations on the proposed Jordan Valley Canal, and notes on some explorations west of Jordan.

The map is only a sketch of routes.

[Eastwick, E. B.]—Handbook of the Panjáb, Western Rajpútáná, Kashmír, and Upper Sindh. London (John Murray): 1883, post 8vo., pp. xii. and 334, maps and map in cover. Price 15s.

Completes the Handbook of India, of which the preceding volumes on Madras, Bombay, and Bengal are also by the late Mr. Eastwick. The present part is to some extent anticipated by Ross's 'Land of the Five Rivers and Sindh,' noticed in the present volume of 'Proceedings,' p. 304, but is more minute in detail and more thorough in treatment, comprising much archæological and historical matter. The map is of Sindh (scale 55 miles to the inch); the maps in cover, on the same scale, are of the Panjáb, Kashmír, and parts of Afghánistán and Bilúchistán, and of the North-West Provinces, Oudh, and Rájpútaná.

Sachau [Dr.] Edward.—Reise in Syrien und Mesopotamien. Leipzig (Brockhaus): 1883, 8vo., pp. x. and 478, maps, photographs, and illustrations. (*Dulau*: price 20s.)

Dr. Sachau's travels in Syria and Mesopotamia commenced in the autumn of 1879, and were continued in 1880, his object (which received official sanction and support) being to collect and copy archæological matter, such as manuscripts, inscriptions, &c. Starting from Damascus, after visiting Palmyra, he went to Aleppo, thence striking south-east by the Jebel-el-Hass to Zebed and again turning north to Membidj (Bambyce Hierapolis), from which point he went east to the Euphrates, following the river northwards for a short distance and ascending the Sâdjûr to Zembûr on the Aleppo road. Here he again struck east to Jerâbis on the western Euphrates bank (opposite the ancient Europus), and went south to Sresat, then ascending the river to Biredjik, and after reaching Urfa (Edessa), working southwards to Ragga (Nicephorium) viâ Harrân (Carrhae). From Ragga he followed the eastern bank of the Euphrates southwards to Ed-Dêr, where he crossed to the western bank, visiting Tabûs (Dabusa) and then continuing southwards to Mejâdin. Here he again crossed the river to Circesium, striking north-east by the Khâbûr river (the Chaboras) and traversing the Shemmar country to the Sindjâr, Tôg, and Jerêbe mountains which run nearly east and west across the desert. From there he continued east to Tel 'Afar and Môsul, and crossing the Tigris, travelled along the foot of the ranges on its eastern bank viâ Tel-Kêpe, Alkôsh, and Zâkhô to Jeziret-ibn 'Omar, where he recrossed and turned again westward, skirting the north of the desert to Nsêbîn (Nisibis), Dârâ, and the ancient Armenian capital of Tigranocerta placed at Tel-Ermen, a little south-west of Mardin. From Mardin he made an excursion to the east to Midjâd in Et-Tôr, returning by a northern route along the valley of Kefr Jôz, and then after visiting Diarbekr, striking homewards by Süwerek (north of Urfa) to Birédjik, again crossing the Euphrates, and ultimately arriving at Alexandretta by Aleppo and Antioch.

Though primarily of historical and archæological interest, Dr. Sachau's travels, especially in Northern Mesopotamia, have resulted in considerable additions to topographical knowledge of the district, as well as details on the relations, habits, &c., of the tribes of the desert. This work contains many copies of ancient inscriptions, &c., and is illustrated by small sketch maps, plans, &c., and twenty-two excellent photographs, some (e. g. the Acropolis of Apamea on the Orontes, selected as a frontispiece) of considerable pictorial effect.

There are also two large maps of the author's routes by Kiepert, on the scale of 1 : 750,000, one of Syria (with insets of the portions of the route from Apamea and of the Sadjûr and northern Euphrates on the scale of 1 : 375,000), the other of Mesopotamia (with insets of the neighbourhood of Tigranocerta on the larger scale). Ruins, topographical features, religious localities, and points of ethnographical value are indicated on these maps, with ancient and modern names where possible.

Walker, [Lieut.-General] J. T. — Account of the Operations of the Great Trigonometrical Survey of India. Volume IX.—Electro-Telegraphic Longitude Operations executed during the years 1875–77 and 1880–81, by Lieut.-Colonel

W. M. Campbell, R.E., and Major W. J. Heaviside, R.E. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., Surveyor-General of India, and Superintendent of the Trigonometrical Survey. Dehra Dun (B. V. Hughes, Office of the Trigonometrical Branch, Survey of India): 1883, 4to., pp. xxiii., 60, 262, (20), and (117), plates i.–vi. and Index Chart.

This volume contains the history and description of the electro-telegraphic operations for the determination of differential longitudes which have been completed by the Survey to the end of 1881 in various parts of India, and on the lines of submarine cable connecting India telegraphically with Europe viâ Aden and Suez. Operating as the survey does, within parallels of latitude situated much nearer the equator than those within which any other geodetic work of importance has hitherto been undertaken, it has supplied data of very great scientific value, apart from its special object, in the form of determinations of lengths and amplitudes of meridional arcs, pendulum operations for determining the variations of force of gravity at stations in widely different positions on mountains, table-lands, interior and coast lines, and now by the aid of electric telegraphy in measuring differential longitudes co-ordinating with latitude measurements. In the preliminary test experiments for these latter operations, large errors were found, causing a feeling of uncertainty as to the ultimate value of the work; but further experience showed that the aggregate errors in telegraphic signalling were immaterial as compared with erroneous local time observations capable of rectification. The present determinations of the differences in longitude between Bombay, Aden, and Suez, combine with those of the differences between Suez, Mokattam, and Greenwich derived from the 1874 Transit of Venus observations, to give the following results:—

Longitudes East of Royal Observatory, Greenwich.

	H.	M.	S.	°	′	″
Mokattam	2	5	6·24	= 31	16	33·60
Suez	2	10	13·17	= 32	33	17·55
Aden	2	59	55·832	= 44	58	57·48
Bombay	4	51	15·805	= 72	48	57·08
Madras Observatory (subject to slight modification)	5	20	59·335	= 80	14	50·03

One of the results of these operations is the acquisition of the value of constant correction to reduce all the longitudes of the Great Trigonometrical Survey to Greenwich, viz., − 2′ 31″·48. The value actually employed pending the completion of the longitudinal arcs for all India is − 2′ 30″. Another and more fundamental addition to geodetic knowledge is the conviction that the values of the elements of the earth's figure hitherto employed as constants, and which were calculated by Colonel Everest, will probably have to give place eventually to values closely approximating to those subsequently deduced by Colonel Clarke; for on substituting the latter, the geodetic values of the arcs are brought into much closer accordance with the electro-telegraphic values. The number of instances in which the geodetic value of a longitudinal arc is in excess of the electro-telegraphic value greatly preponderates over those in which the geodetic value is in defect. The average excess is about 10″ with Colonel Everest's constants, and 6″ with Colonel Clarke's. This is believed to be due to deflections of the plumb-line towards the sea and away from the continent on the coasts, and is in accordance with the results of the pendulum observations by Captain Basevi, which indicate a probably greater density in the strata of the earth's crust under oceans than those under continents.

AFRICA.

Doelter, [Dr.] Cornelis.—Über die Capverden nach dem Rio Grande und Futah-Djallon. Reiseskizzen aus Nord-West Afrika. Leipzig (Paul Frohberg): 1884 [1883], 4to., pp. viii. and 263 [no index], map and illustrations. (*Williams & Norgate*: price 13*s.*)

Dr. Doelter, Professor at the Royal University of Gratz, went to the Cape Verde islands in 1880, thence crossing to Senegambia. Bolama, Bissao, Buba

on the Rio Grande, and Geba on the river of the same name, are the chief places he visited, his return to Europe being made in 1881. He discusses in a general way colonial interests, the origin, distribution, languages, religions, habits and customs, industries, &c., of the Fulahs, Mandengas, and Pepels, and the physical geography of South Senegambia, especially as to the highlands of Futa Jallon, the little-known river-systems of the Comba and Rio Grande, the coast formation, geology and mineral products, fauna, flora, diseases, climate, &c.

The map (scale 1 : 1,500,000) is of the country from the mouth of the Casamanza to a little south of the Rio Grande, including the Bissagos group, and Bolama, with an inset of Buba (1 : 400,000).

Macquarie, J. L.—Voyage à Madagascar. Paris (Dentu): 1884 [1883], 12mo., pp. 435, illustrations. (*Dulau*: price 3*s.* 6*d.*)

The writer gives a general description of Madagascar and its inhabitants, especially in connection with French colonial interests, basing his narrative upon a visit to the island at the end of 1878 by MM. Trottet and Rozan. The illustrations are from sketches by M. Richard, Secretary of the French Mission on the coronation of Radama II.

Peace, Walter.—Our Colony of Natal. Published by permission of the Natal Government. London (Stanford): [1883], 8vo., pp. 174, map in cover. Price 3*s.* 6*d.*

A descriptive account, compiled from various trustworthy sources, and specially intended for emigrational purposes. The map (scale 9 miles to the inch) is compiled in the office of the Surveyor-General (P. C. Sutherland, Esq.) and furnished by him.

AMERICA.

Im Thurn, Everard F.—Among the Indians of Guiana: being sketches, chiefly anthropologic, from the interior of British Guiana. London (Kegan Paul, Trench, and Co.): 1883, 8vo., pp. xvi., 445, map and illustrations. Price 18*s.*

The varied subjects of this book, which includes different aspects of the geography, anthropology, fauna, and flora of those parts of the colony visited by Mr. im Thurn, and which happily combines scientific accuracy with picturesque and entertaining descriptions, cannot fail to insure for it a place among the standard favourite works on tropical countries.

The first two chapters, "A journey into the interior," are avowedly rewritten from the author's paper published in our 'Proceedings' (1880, p. 465), the map accompanying which is also practically reproduced. To these is added an account of the Kaieteur Fall and Roraima, the former from two visits in the dry and wet seasons. In the dry season, the first view of the Kaieteur is described as most disappointing; the ravine of the Potaro then ends in a bare cliff face, with no trace of water, and it is not until the spectator reaches the river-edge about a quarter of a mile from the fall, and just at the mouth of the amphitheatre of 800 feet high walls, that the cataract, less than half its usual width, and confined to the left-hand quarter of the amphitheatre, is seen.

Mr. im Thurn's personal experiences are interwoven in the remainder of the book with his descriptions of the aspects of plant- and animal-life, and of Indian tribes. In discussing the latter, separate chapters are given on the family- and marriage-systems, physical appearance and dress, houses and settlements, social-life, hunting and fishing, agriculture, food, manufactures, feasts, opposed local systems of imaginary evil and good influences, known as "Kenaima" and "Peaiman," religion, folk-lore, and antiquities. Some parts of these have already appeared in the 'Journal of the Anthropological Institute' and 'Gardeners' Chronicle,' and they have also been partially discussed in the magazine called 'Timehri' (a name given as "Temehri" in this volume) which has been before noticed. The rock engravings signified by that word are of course treated at some length, with illustrations. Some of these are from original sketches, others from photographs; of the latter, a view on the Potaro opposite p. 57 calls for special praise.

Schumacher, Hermann A.—Südamerikanische Studien. Drei Lebens- und Cultur-Bilder. Mútis, Cáldas, Codazzi. 1760–1860. Berlin (Mittler): 1884 [1883], 8vo., pp. xiii. and 559. (*Dulau:* price 12*s.*)

Biographies, with accounts of the travels and scientific work of José Mútis, Francisco Cáldas, and Agostino Codazzi, chiefly in Colombia and Venezuela. The notes at the end contain much information on geographers, travellers, and geographical subjects in South America.

AUSTRALASIA.

Coote, Walter.—The Western Pacific. Being a description of the groups of islands to the north and east of the Australian continent. London (Sampson Low & Co.): 1883, 12mo., pp. xvi. and 184, map and illustrations. Price 2*s.* 6*d.*

Mainly reprinted from the author's 'Wanderings South and East' (R.G.S. 'Proceedings,' 1882, p. 248), with the addition of a few pages on the subject of colonial extension in the Pacific. Norfolk Island, Fiji (Ovalau, Mbau, and the Rewa district), the New Hebrides, Banks, Torres, Santa Cruz, Solomon, and Loyalty Islands, and New Caledonia are discussed, with a general concluding chapter on labour and trade in the Western Pacific. Speaking of New Guinea in his introduction, the author says: "If I except Mr. Chester, no one has to any appreciable extent explored the higher plateaus and ranges of New Guinea." It is therefore to be assumed that the well-known magistrate of that name at Thursday Island has made explorations in the interior of New Guinea of which the results are not as yet made public.

Vallée, Léon.—Essai d'une Bibliographie de la Nouvelle-Calédonie et dépendences. Paris (Klincksieck): 1883, 12mo., pp. 68. (*Dulau*: price 2*s.*)

A list of books, articles, papers, &c., bearing on New Caledonia, arranged alphabetically, and also indexed under subjects.

ARCTIC.

The "Corwin."—Cruise of the Revenue-steamer *Corwin* in Alaska and the N.W. Arctic Ocean in 1881. Notes and Memoranda: Medical and Anthropological; Botanical; Ornithological. Washington (Government Printing Office): 1883, 4to., pp. 120, plates (coloured and plain).

This valuable contribution to scientific Arctic literature is introduced by a printed letter from Mr. H. F. French, the Secretary of the Treasury (Treasury Department, Document No. 429), who makes the return to the U.S. House of Representatives. It contains: (1) Medical and Anthropological Notes on Alaska, by Irving C. Rosse, M.D., with illustrations of highly magnified hair sections, and human crania; (2) Botanical notes on Alaska, by John Muir, covering Unalaska, St. Lawrence Island, St. Michael's, Golovin bay, Kotzebue Sound, Capes Thompson, Prince of Wales, and Lisbourne, Cape Wankerem in Siberia, Plover bay, Herald Island, and Wrangell Island. The latter is of course of the greatest interest; the stay of the *Thomas Corwin* was too short for a full collection, but twenty-seven phanerogamous plants were found. (3) Birds of Bering Sea and the Arctic Ocean, by E. W. Nelson, illustrated by good coloured figures, and followed by a list of fishes known to occur in the Arctic Ocean north of Bering Strait, by Tarleton H. Bean, with two plates.

It will be remembered that this revenue steamer, commanded by Captain C. L. Hooper, was (after her fruitless attempt in 1880) sent in May 1881 with instructions to search for the *Jeannette* and two missing whalers. During this expedition she reached Wrangell Land, which was in the same year proved by Captain Berry of the *Rodgers* to be an island. An account of her voyage is given in our 'Proceedings' for 1881, p. 731, but more precise details on some points are incidentally afforded by the present report (which, however, contains no narrative). Describing the landing on Wrangell Island, Mr. Muir says that the rock formation where they landed and for some distance along the coast to the eastward and westward was a close-grained clay slate, cleaving freely into

thin flakes, with here and there a few compact metamorphic masses rising above the general surface. Where it was exposed along the shore bluffs, and kept bare of vegetation and soil by the action of the ocean, ice, and heavy snow-drifts, the rock presented a surface about as black as coal, without even a moss or lichen to enliven its sombre gloom. But when this dreary barrier was passed, the surface features of the country in general were found to be finely moulded and collocated, smooth valleys, wide as compared with their depth, trending back from the shore to a range of mountains that appeared blue in the distance, and round-topped hills, with their side curves finely drawn, touching and blending in beautiful groups, while scarcely a single rock-pile or sheer-walled bluff was seen to break the general smoothness. The soil had evidently been derived mostly from the underlying slates, though a few fragmentary wasting moraines were observed containing travelled boulders of quartz and granite, doubtless brought from the mountains of the interior by glaciers that had recently vanished—so recently that the outlines and sculptured hollows and grooves of the mountains had not as yet suffered sufficient post-glacial denudation to mar their glacial characters appreciably. The banks of the river at the mouth of which the landing was made presented a striking contrast as to vegetation to that of any other stream seen in the Arctic regions. The tundra vegetation was not wholly absent, but the mosses and lichens of which it is elsewhere composed were about as feebly developed as possible, and instead of forming a continuous covering, occurred in small separate tufts, leaving the ground between them raw and bare as that of a newly-ploughed field. The phanerogamous plants, both on the lowest grounds and the slopes and hill-tops as far as seen, were in the same severely repressed condition, and as sparsely planted in tufts an inch or two in diameter, with about from one to three feet of naked soil between them. Some portions of the coast, however, further south presented a greenish hue as seen from the ship at a distance of eight or 10 miles, owing no doubt to vegetation growing under less unfavourable conditions.

Dr. Rosse's notes, apart from their professional value, as regards Arctic expeditions, and from their specially anthropological nature, contain various useful observations on climate, meteorology, and density of sea-water. The winter temperature at St. Michael's is recorded as reaching − 45° Fahr., Eskimo dogs and wild geese being frozen to death. The effect of alcohol in high latitudes is discussed with some detail, the writer being obviously of opinion that in moderation its use is beneficial. His experience also negatives the proverbial enormous appetites of the Eskimo, who were found to be inferior in muscular strength to Dr. Rosse, and to be no more (indeed possibly less) capable of enduring cold than whites.

The "Jeannette."—The Voyage of the *Jeannette*. The Ship and Ice Journals of George W. De Long, Lieutenant-Commander U.S.N., and Commander of the Polar Expedition of 1879–1881. Edited by his wife, Emma De Long. London (Kegan Paul, Trench & Co.): 1883, 8vo., pp. i.–xii. and 1–440; i.–x. and 441–911, maps, plates, and illustrations. Price 36*s*.

So many accounts of the ill-fated *Jeannette* have been published, and noticed in our 'Proceedings,' that the present voluminous work calls for no special mention, however full of interest in consequence of its precise and authentic details of the daily occurrences from the hopeful start to the melancholy close of the expedition. It would be superfluous in such a notice as the present to comment on the noble endurance both of mind and body which is so touchingly shown by the late commander's journals now printed in full.

Commencing with a biography of George Washington De Long (including an extract from his report when commanding the U.S. steam-launch *Little Juniata* during the *Polaris* relief search of 1873), the first volume contains full particulars of the origin and fitting out of the expedition, the purchase of the vessel so well known to English "Arctics" as the *Pandora*, and the composition of her crew and officers. De Long's diary commences with the start from San Francisco, and records the journey to Unalaska, Norton Sound, Bering Strait (for which the old reading of "Behring" is retained throughout, though

shown to be incorrect by Elliot, in his 'Monograph of the Seal-Islands of Alaska,' noticed in R.G.S. 'Proceedings,' 1882, p. 444), Wrangel Island, and thence north-west to the De Long Islands (north-east of the Liakhov group), where the ship was crushed on June 12, 1881. It is continued during the boat journey to the Lena delta, the last entry being on October 30, 1881.

The narrative is completed by the accounts of the adventures of the men Nindemann and Noros, who were sent in search of help; of Mr. Melville and Lieutenant Danenhower with the whale-boat party; and of the searches and final official inquiry.

The volumes are illustrated by various portraits, plates, wood engravings, vignettes, and diagrams, and the maps and charts are as follows:—A chart of the track of the *Juniata* and *Little Juniata* during their *Polaris* search; a circumpolar chart, showing highest points reached by different navigators; track-chart of the *Jeannette* from San Francisco to sinking, with subsequent route over the ice to the Siberian coast; a separate map of the latter portion; a map of the Lena delta; and another, showing the route after landing and the routes of the search parties.

The scientific results of the expedition are only partially recorded in the text of the work and the Appendix (which includes papers by De Fonvieille on Arctic ballooning, by Dr. Ambler on ice formed by sea-water, and on snow-crystals, &c., and by Mr. Melville on construction and fitting of a vessel for Arctic exploration, with illustrations; also some tide measurements at Bennett Island); but it is stated that the U.S. Government will hereafter issue the notes of the naturalist, the meteorological observations, and the electrical and auroral observations of Lieutenant Chipp.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

Schumann, Dr. Carl.—Verbreitung der Lauraceen. Equatorial scale 1:135,000,000 or 30¾ degrees to an inch. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 73. Justus Perthes, Gotha. (*Dulau.*)

EUROPE.

Alpen, Wandkarte der——, von E. Leeder. Scale 1:750,000 or 10·3 geographical miles to an inch. Essen, G. D. Baedeker. 6 sheets. Price 10*s.* (*Dulau.*)

Oesterreich-Ungarn, Generalkarte von——. Scale 1:500,000 or 6·8 geographical miles to an inch. Teschen, Prochaska. Price 2*s.* (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie, Specialkarte der——. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut, Wien, 1883. Sheets:—Zone 15, Col. XV. Oedenburg. Zone 15, Col. XVII. Raab. Zone 16, Col. XV. Güns. Zone 16, Col. XVII. Pápa. Zone 17, Col. XV. Steinamanger und Körmend. Zone 17, Col. XVI. Hecyes-kis-Somlyó. Zone 18, Col. XV. Csákány und Zala-Lövö. Zone 18, Col. XVI. Sümeg und Zala-Egerszeg. Zone 19, Col. XV. Alsó-Lendva und Lenti. Zone 21, Col. XVII. Nacy-Atâd und Szigetvár. Zone 23, Col. XVII. Slatina und Vočin. Zone 23, Col. XXIII. Szerb-Jttebe. Zone 24, Col. XII. Altenmarkt und Ogulin. Zone 24, Col. XIII. Karlstadt und Vojnič. Zone 24, Col. XVII. Požega und Neu-Gradiška. Zone 24, Col. XVIII. Našice und Kutjevo. Zone 25, Col. XI. Veglia und Novi. Zone 25, Col. XIII. Sluin. Zone 25, Col. XVI. Alt-Gradiška und Orahova. Zone 26, Col. XI. Cherso und Arbe. Zone 26, Col. XII. Zengg und Otočac. Zone 26, Col. XIII. Plitvice. Price 1*s.* 4*d.* each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

1-inch—General Maps :—

SCOTLAND : Sheet 116 (Hill-shaded). Price 1*s.* 9*d.*

6-inch—County Maps :—

ENGLAND : **Berks** : Sheet 8 combined with 44 Oxford ; sheet 16 combined with 49 Oxford ; sheet 22 combined with 52 Oxford ; sheet 38 ; 2*s.* 6*d.* each. **Derby** : Quarter sheet 17 S.W. ; 1*s.* **Oxford** : Sheet 44 combined with 8 Berks ; sheet 49 combined with 16 Berks ; sheet 52 combined with 22 Berks ; 2*s.* 6*d.* each. **Wilts** : Sheet 48 filled in with 14 Hants ; sheet 67 filled in with 38 Hants ; 2*s.* 6*d.* each. **Shropshire** : Quarter sheets 40 S.E. ; 50 N.E. ; 51 S.W. ; 51 S.E. ; 54 S.E. filled in with Montgomery 38 S.E. ; 55 N.W. ; 55 S.W. ; 56 N.E. ; 56 S.W. ; 57 S.W. ; 57 S.E. ; 58 N.W. ; 58 N.E. ; 58 S.W. ; 58 S.E. ; 59 N.W. ; 59 S.W. ; 59 S.E. ; 62 N.W. ; 64 S.W. ; 65 N.E. ; 66 N.E. ; 66 S.W. ; 80 S.W. ; 81 N.W. ; 1*s.* each.

25-inch—Parish Maps :—

ENGLAND : **Bedford** : Aspley Guise, 7 sheets and Ar. Bk. ; Flitton, 7 and Ar. Bk. ; Marston Moretaine 14 ; Wootton 11. **Derby** : Mackworth, Ar. Bk. ; Mickleover 13, and Ar. Bk. ; Sandiacre 3, and Ar. Bk. ; Sawley 9, and Ar. Bk. ; Spondon 10, and Ar. Bk. ; Stanton by Dale 3, and Ar. Bk. ; **Gloucester** : Dursley 7, and Ar. Bk. ; Newington Bagpath 11, and Ar. Bk. ; North Nibley and Do. (Det., Nos. 4 to 9) 9, and Ar. Bk. ; Saul and Do. (Det., Nos. 1 to 14) 3, and Ar. Bk. ; Stapleton 9, and Ar. Bk. **Monmouth** : Grosmont 18 ; Llantilio Crossenny 16. **Norfolk** : Morley St. Botolph, Ar. Bk. **Nottingham** : Arnold, Ar. Bk. **Shropshire** : Harley and Do. (Det.) Ar. Bk. ; Linley 4 ; Ratlinghope 16 ; Ruckley and Langley 5 ; Stirchley 6 ; Woolstaston 4. **Suffolk** : Rendlesham 4.

ASIA.

Arabia and Persia, Map of parts of——, in two sheets. Scale 1 : 2,000,000 or 27·7 geographical miles to an inch. Compiled in the Office of the Trigonometrical Branch, Survey of India, Dehra Dún, at the request of Colonel Ross, Political Resident in the Persian Gulf, from the twelve sheets of map of parts of Arabia and Persia prepared at Dehra Dún in January 1880, with additions and corrections by Colonel Ross ; from 6 sheets of Colonel Miles' outline coast supplied by Colonel Ross ; from General A. Houtum-Schindler's Routes in South-Western and Southern Persia, 1877 to 1880 ; from Lieutenant-General J. T. Walker's map of Turkestan 1883 ; from map accompanying E. A. Floyer's Unexplored Baluchistan, 1882, and from Captain E. L. Durand's sketch-map accompanying his Report of a tour in Fars, 1879. Photozincographed at the Office of the Trigonometrical Branch, Survey of India, Dehra Dún, July 1883.

Asie, Carte indiquant les positions relatives des colonies françaises en——, par V. A. Malte-Brun. (Atlas de la France illustrée.) Paris, J. Rouff. (*Dulau.*)

Houtum-Schindler, General A.—Route von Zendjân nach Tacht i Soleimân. Aufgenommen 1880 von General A. Houtum-Schindler. Scale 1 : 506,880 or 6·9 geographical miles to an inch. D. Reimer, Berlin, 1883. Zeitschr. der Ges. f. Erdk. zu Berlin, Bd. xviii. Taf. 6. (*Dulau.*)

—— —— Route von Qazwîn nach Tabrîz. Aufgenommen 1881–82 von General A. Houtum-Schindler. Scale 1 : 1,013,760 or 13·8 geographical miles to an inch. D. Reimer, Berlin, 1883. Zeitschr. der Ges. f. Erdk. zu Berlin, Bd. xviii. Taf. 7. (*Dulau.*)

—— —— Route von Tabrîz nach Sâûdjbulâgh. Aufgenommen 1881–82 von General A. Houtum-Schindler. Scale 1 : 506,880 or 6·9 geographical miles to an inch. D. Reimer, Berlin, 1883. Zeitschr. der Ges. f. Erdk. zu Berlin, Bd. xviii. Taf. 8. (*Dulau.*)

Tonkin (Tong-Kin), Carte du——, dressée à Haï-Phong par M. Mallart-Cressin, Ex-capitaine d'Infanterie de Marine, Capitaine de Gendarmerie. Scale 1 : 850,000 or 11·6 géographical miles to an inch. Paris: Maison Logerot, J. Gaultier, Editeur-géographe. (*Dulau.*)

This map shows very plainly all roads, forts, towns, villages, and missions. The rapids on the rivers are marked; the lettering is large, and the boundaries clearly shown. An inset map on a reduced scale of Tonquin and the neighbouring states is also given.

Tschuktschen-Halbinsel, Ethnographische Karte der——. Entworfen von Dr. A. Krause. Scale 1 : 7,000,000 or 97·1 geographical miles to an inch. Deutsche Geographische Blätter, Band vi. Tafel 2. Geograph. Anst. v. Wagner & Debes, Leipzig, 1883. (*Dulau.*)

AFRICA.

Emin-Pey, Dr., Originalkarte der Reise des——, in die Mudirië von Rohl u. Makraka. Oktober und November 1882. Konstruiert u. mit Dr. W. Junkers Routen-Aufnahmen kombiniert von Bruno Hassenstein. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 12. Justus Perthes, Gotha. (*Dulau.*)

Sierra-Leone und das Timméné-Land. Nach den Forschungen der Verminckschen Expedition unter E. Vohsen, Dr. W. Hart u. E. Keller, 1882. Scale 1 : 600,000 or 8·1 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Tafel 11. Justus Perthes, Gotha. (*Dulau.*)

Sierra Leone und Liberia,—Die englischen Besitzungen und die unabhängigen Stämme an der Küste zwischen——. Nach offiziellen Quellen gezeichnet von Bruno Hassenstein. Scale 1 : 250,000 or 3·4 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1883, Seite 431. (*Dulau.*)

AMERICA.

Amérique, Carte des colonies françaises en——, par V. A. Malte-Brun. (Atlas de la France illustrée). Paris, J. Rouff. (*Dulau.*)

Greenland.—Trois Cartes précolombiennes représentant une partie de l'Amérique (Groenland). Fac-simile presentés au Congrès International des Américanistes à Copenhague par A. E. Nordenskiöld. 1883. Photolithographie de l'Institut Lithographique de l'Etat-Major Général. Typographie de l'Imprimerie Centrale. Stockholm. Price 3*s.* 6*d.* (*Dulau.*)

Yukon, Karte des Tschilkat-Gebietes mit den Pässen zum——. Nach eigenen Aufnahmen im Jahre 1882 von Dr. Arthur Krause. Scale 1 : 500,000 or 6·8 geographical miles to an inch. D. Reimer, Berlin, 1883. Zeitschr. der Ges. f. Erdk. zu Berlin, Bd. xviii. Taf. 9. (*Dulau.*)

AUSTRALASIA.

New Zealand, Map of——. Scale 1 : 2,550,000 or 34·9 geographical miles to an inch. Dr. James Hector. Photo-lithographed at the General Survey Office, Wellington, N.Z., 1883.

This map contains statistical tables of the trade, population, means of communication, immigration, telegraphs, finance, &c., and must be most useful for reference to all interested in the colony.

North-Western Australia.—Map to accompany the Report on the Kimberley District, by the Honorable John Forrest, C.M.G., Commissioner of Crown Lands and Surveyor General. Showing the Route followed and the Natural Features and Description of the Country. Scale 1 : 512,000 or 7 geographical miles to an inch. Photo-lithographed at the Surveyor General's Office, Perth, W.A., 1882.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in September and October 1883.

No.			Inches.	
1826	m	=	0·5	England, west coast:—Formby point to the firth of Solway. Price 2*s.*
1571	m	=	1·25	Spain, east coast:—Port Alfaques. Burriana road. Castellon de la Plana road. Price 1*s.*
497	m	=	1·25	Sea of Marmara:—Gulf of Ismid. Price 4*s.*
2522	Plan added, Imbituba bay.			
23	Plan added, Caracciolo bay.			
877	Plan added, Rayo cove.			
604	Plan added, Port Ambriz.			
875	Plan added, Ba-Moon anchorage.			

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
1965	Formby to Fleetwood	New chart. Formby point to the firth of Solway	1826
1826	Fleetwood to firth of Solway ..		
1571	Port Alfaques	New plan. Port Alfaques	1571
81	Telok Betong.		
1050	Admiralty gulf and Vansittart bay.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1934. England, east coast:—Entrance to the river Tyne. 2212. China:—Hui-Ling San harbour to Hong Kong. 755. Bay of Bengal:—False point anchorage. 761. West Indies:—West India islands and Caribbean sea, sheet 1. 1069. Australia, east coast:—Port Jackson. 401. Australia, south coast:—Port Augusta. 941*a*. Eastern Archipelago, western portion. 2761. Sumatra, west coast:—Tyingkokh bay to Sunda strait. 2056. Eastern Archipelago:—Sunda strait. 1513. Mediterranean, Archipelago:—Salamis and Eleusis bays. 2682. England, west coast:—Nash point to New Passage. 477. South America, west coast:—Trinidad channel. 2351. Australia, east coast:—Cape Tribulation to cape Flattery. 1757. Fiji islands.—Nukulau island to Namuka island. 2202*a*. South Atlantic ocean:—Eastern portion. 987. South Pacific ocean:—Plans of islands. 2526. South America, east coast:—Buenos Ayres road. 2062. China:—Tong-King gulf. 1179. England, west coast:—Bristol channel. 2397*b*. Scotland:—North and east coasts. 2562. China:—Canton river. 2622. Scotland, north coast:—Fair isle. 1951. England, west coast:—Liverpool bay. 2206. Black sea:—Odessa bay. 2160. Eastern Archipelago:—Carimata strait. 1309. South America, east coast:—Ports Desire and Gallegos, Sea Bear bay. 136. Bay of Bengal:—Calcutta to Saugor point. 269. North America, east coast:—Sapelo sound to Florida and Providence channels. 2550. Scotland, east coast:—Port of Wick. 1875. North sea:—Elbe, Weser, and Jade rivers. 1872. North sea:—Calais to the river Schelde entrance. 1895. England, south coast:—Dungeness to the Thames. 2160. France, north

coast:—Boulogne to Dunkerque. 1601. China:—Wusung river. 1256. China:—Pe-chili and Liau-tung gulfs. 2681. Mediterranean, Egypt:—Abukir bay. 303. Newfoundland:—Miquelon islands. 2378. Black sea:—Büg river. 2680. France, north coast:—Havre roadstead. (*J. D. Potter, agent.*)

Cani Rocks from the Shoal discovered by Capt. G. Jinman, F.R.G.S., and Capt. J. H. C. Leuty, September 1883.

United States Charts.— No. 928. Caroline Island. South Pacific Ocean. Surveyed by the Officers of the U.S.S. *Hartford*. Capt. C. C. Carpenter Commanding, 1882. Price 1*s*. 3*d*.—No. 927. Northern part of the Labos Afuera Islands. From a Peruvian Survey. Price 10*d*. Published October 1883, at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

EDUCATIONAL.

Amerika, Schul-Wandkarte von——, von V. Haardt. Scale 1:10,000,000 or 136·9 geographical miles to an inch. Wien, Hölzel. 4 sheets. Price 8*s*. (*Dulau.*)

Europa, Schul-Wandkarte von——, von V. Haardt. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Politische Ausgabe. 4 sheets. Wien, Hölzel. Price 8*s*. (*Dulau.*)

Graeciae antiquae tabula in usum scholarum descripta. Scale 1:500,000 or 6·8 geographical miles to an inch. Berlin, D. Reimer. 9 sheets. Price 12*s*. (*Dulau.*)

Italia antiqua in usum scholarum scripta. Scale 1:800,000 or 10·9 geographical miles to an inch. Berlin, D. Reimer. 6 sheets. Price 9*s*. (*Dulau.*)

Publd for the Proceedings of the Royal Geographical Society 1883

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